vol. III no. 7

March, 1944

School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

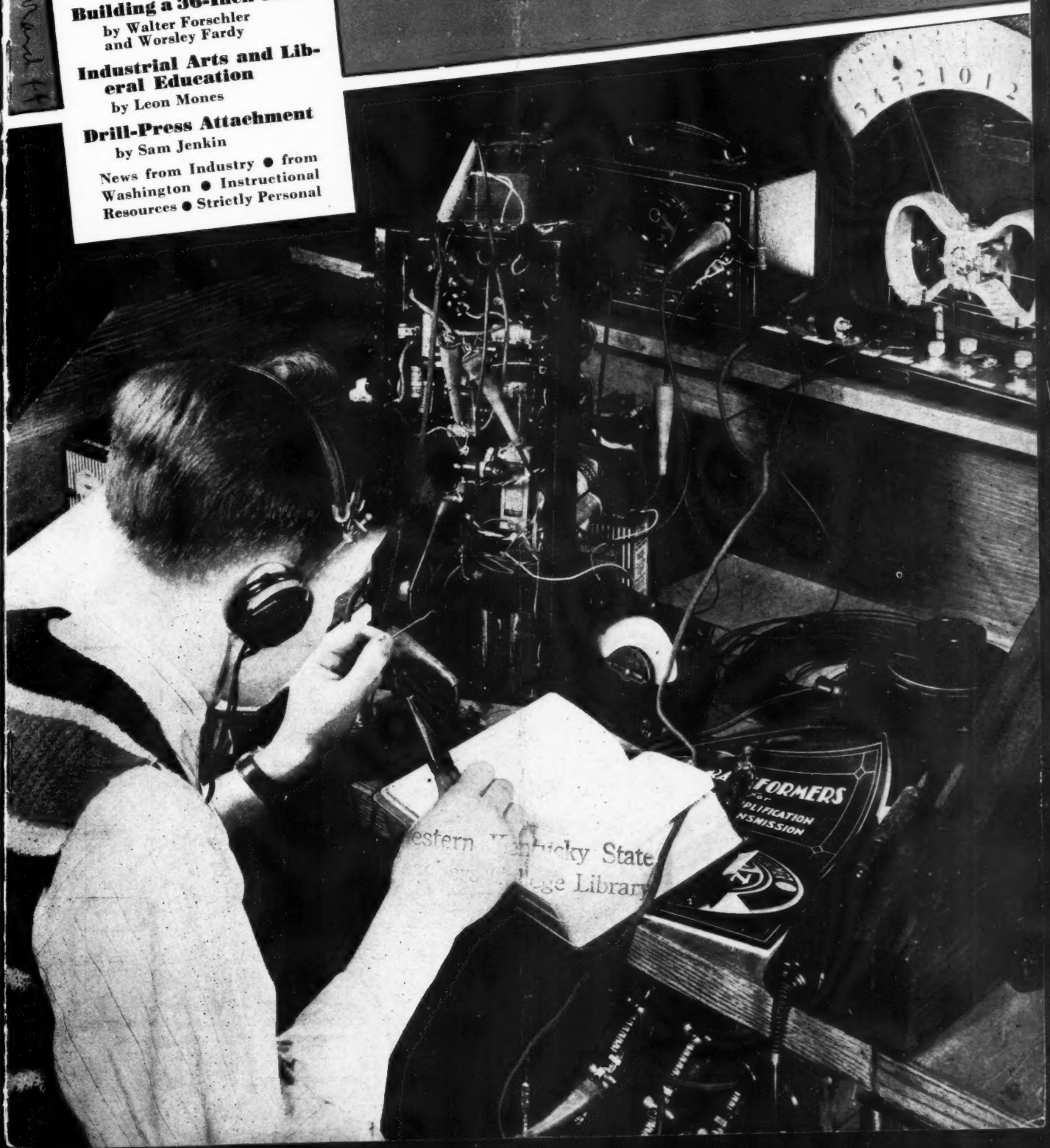
The Reconversion of Vocational Education
by H. W. Arlin

Building a 36-Inch Globe
by Walter Forschler and Worsley Fardy

Industrial Arts and Liberal Education
by Leon Mones

Drill-Press Attachment
by Sam Jenkin

News from Industry ● from Washington ● Instructional Resources ● Strictly Personal



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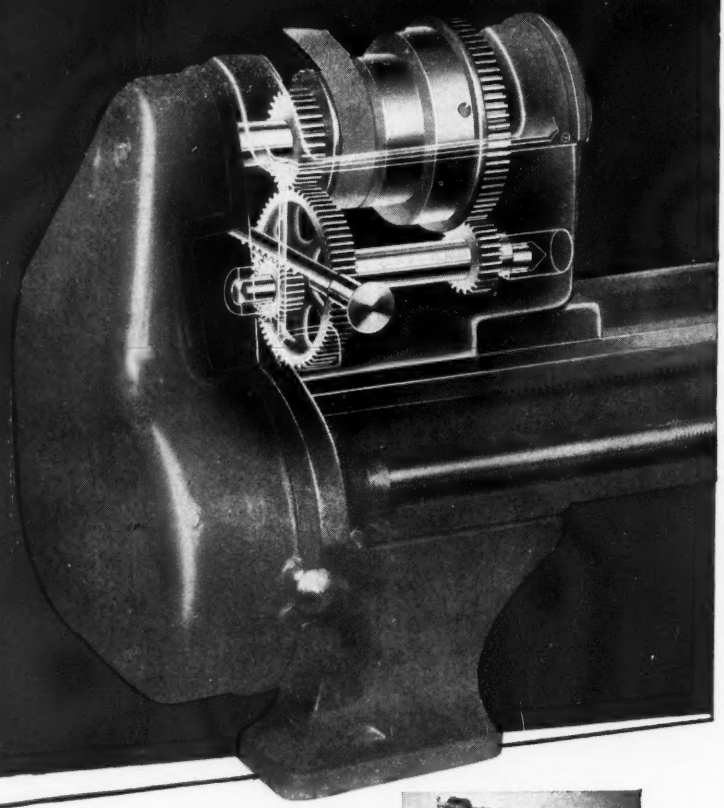

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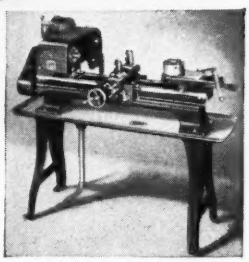
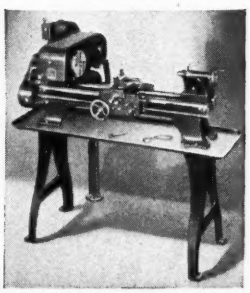


No. 850 Manufacturing Lathe



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The Cover . . . . .

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School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

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SCHOOL SHOP has moved to new and larger quarters. Our new address is: **330 South State Street, Ann Arbor, Michigan**

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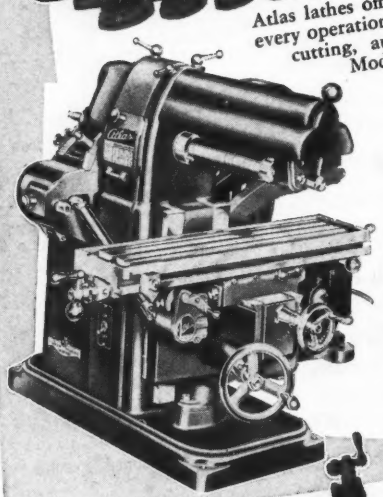

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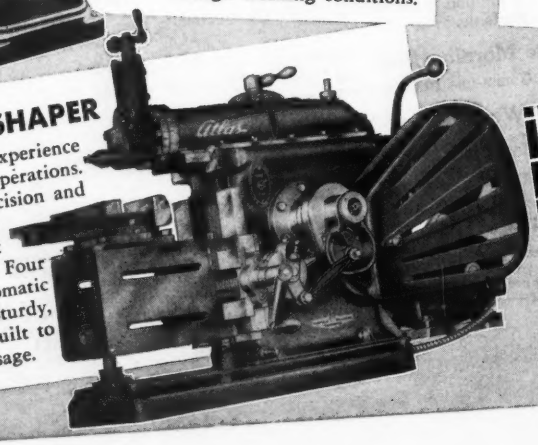

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The Reconversion of Vocational Education

BY *H. W. Arlin*

Here is a preview of the postwar problem of a typical American industry and the help that it hopes to secure from vocational education. While the situation will vary from community to community, this is a typical example of things to come in what we hope is the not-too-distant future. H. W. Arlin is manager of industrial relations for the Westinghouse Electric and Manufacturing Co., Mansfield, Ohio.

ONE of the outstanding lessons of the present war has been the need of training for a specific job to be performed. This realization by our citizens of the emphasis placed on training should augur well for vocational training in the postwar period. In any comprehensive discussion of this subject, the inclusion of the home-appliance field could be justified solely on the basis that it directly affects the majority of American homes. We who are engaged in the electrical home-appliance industry believe that public vocational training can serve our business and through it the public, not only from the standpoint of manufacturing, but also from the standpoint of distribution and utilization which in turn include the problems of servicing and the field of home economics. Although in many respects the vocational education needs of the electric-appliance industry are similar to those of industry in general, there are in some respects certain needs more or less identified with this particular industry. In the postwar era these needs in many cases will vary only in extent rather than in character from those of the prewar period.

When planning courses of study, administrators and teachers of vocational education should give consideration to instruction in time and motion studies says the author of this article.

Prospective developments in the postwar electrical appliance industry to which vocational education can contribute must be considered in the light of present wartime conditions existing within the industry. With our country's entrance into the war the electrical manufacturing industry, along with most other American industries, was called on to organize its resources and facilities in an all-out effort to provide arms and equipment for the armed forces. Such effort, however, in most instances consisted primarily of greatly increased manufacturing schedules of peacetime products, allowing for variations in design, with the government largely replacing private enterprise as the purchaser. Electrical manufacturers continued to manufacture radio equipment, ship propulsion and control equipment, motors, transformers, instruments, lamps, lighting facilities, etc.

That phase of the electrical manufacturing industry known as the electrical-appliance business, however, was not so fortunate. It was in this field and particularly in the field of home appliances that manufacturers almost overnight found themselves out of business. The manufacture of refrigerators, ranges, irons, toasters, vacuum cleaners, fans, etc., gave way to the manufacture of war products. In no other field was the conversion to war products more complete than in the electrical appliance industry. In many cases, particularly in those plants manufacturing heating appliances, available facilities did not lend themselves to the manufacture of war products. Such plants, considered primarily as sheetmetal working plants, were faced with the necessity of purchasing machine tools and other plant facilities in order to manufacture the products required by the armed forces.

This radical change in the nature of products to be manufactured required the teaching and learning of new technics; first by the supervisory force, and then by the workers. This was accomplished by the temporary assignment of supervisors to government arsenals and factories already engaged in the manufacture of war products similar to those for which contracts had been received. Training within industry was inaugurated on a large scale, including classroom work and training on the job. In this program the federal government gave its assistance.

Because of the short space of time available, much of this training was through necessity of a single purpose nature; that is, the training of individuals to perform a single operation. This was accomplished in many instances through promotion to jobs requiring higher skill, out of which procedure the well-known wartime term "upgrading" came into prominent use. Through these various intensive training programs the electrical appliance industry successfully met the challenge of product conversion.

In the meantime, two things happened which will materially affect the training problem for the postwar period. In the first place, certain occupations and processes dominant in the manufacture of household appliances have almost disappeared from the scene. Among these can be included such processes as porcelain enameling, plating, and synthetic finishes, along with such allied occupations as polishing, buffing, and spraying. Such a situation forecasts a postwar retraining program in which employes will be required to relearn certain technics acquired and maintained only through constant application

or practice. For example, such operations as the proper mixing of enamels, the preparation and cleansing of materials, the proper application or spraying of enamel, rimming and wiping, proper burning, the proper care and handling of parts, all of which are essential to good enameling practices, must be relearned by employes formerly engaged in this work.

A second major factor to be considered is the large consumer demand being built up for the purchase and use of electric appliances. This can only reflect itself in the need for increased personnel and an adequate training program. This problem will be accentuated even more due to the failure of men in the service, for one reason or another, to return to their former jobs.

One of the foremost occupations to be given attention in the postwar training program will be that of tool and die makers. Although common to most industry, the tool and die maker is indispensable to the manufacture of home appliances. This type of apprenticeship training has practically stopped because of the demand for young men in the armed services. As a result, industry has been forced to depend largely on single purpose training instead of the training of all-around machinists. This type of training, although satisfactory for most production requirements, is not satisfactory for the building of tools and dies. The need for tool and die makers is particularly urgent in the home-appliance field because of the annual change in styles and designs to meet an ever-changing demand from the buying public. With the almost complete stoppage of apprenticeship training, many skilled craftsmen are reaching retirement age. This factor only serves to augment the training problem ahead.

The resumption of appliance manufacturing will find many prewar designs bridging the gap until new designs and new tools can be developed.

It is in this field that vocational training can continue to play an important part. The boy who has had machine-shop training in high school or in a vocational school will be the one most in demand for industrial apprenticeship programs. During his vocational school work he has had the opportunity to determine his qualifications and fitness for such a vocation and has gained the experience which will be valuable in industrial work. In the electric appliance division it is considered essential that apprentices come from vocational schools.

Another type of training or experience closely allied with that of machine-tool operation and one to which many vocational schools can contribute is that of machine repair. Many opportunities occur within vocational school machine shops for this type of experience. Such training could include re-machining of bearings, recutting of shafts, alignment of parts, scraping inways, and similar repair operations. Machine-shop courses might well include a study of hydraulic circuits in view of a noticeable trend toward hydraulic operated machines.

The continual rearrangement and installation of plant facilities, along with the upkeep of such facilities, will continue to require a large number of men trained in the maintenance crafts. Our vocational schools can contribute greatly in training men as carpenters, pipefitters, tinners, millwrights, and electricians. The building of new appliance samples or hand-made models, the installation of ventilation facilities for processing operations, and other kindred operations in this type of sheet-metal industry will require many men trained as sheetmetal workers.

Vocational training programs, wherever possible, should be designed to meet local conditions and the needs of local industry. This can be accomplished through local cooperation between the vocational school administrators and local manufacturers in a study of community needs. Small jobs can often be secured from local industry to give the student actual training on production work.

The matter of vocational choice and vocational guidance should be given careful attention. Where one student may want to become an electrician, the next one may want to become a die-maker. Thus the needs of the community as well as the desires of the student may be satisfactorily answered.

Although identified with most American industry today, the subject of time and motion analysis is particularly applicable to the home-appliance industry because of the extremely competitive nature of the business and the importance and necessity of eliminating unnecessary operations in conveyorized mass-production lines. Because of the higher wartime wage structure which will carry over into the postwar era, every effort will be made to analyze manufacturing methods in order to obtain cost reductions. In the operation of the employes' suggestion system it has been found that the most valuable suggestions come from employes who have had time-study experience. Vocational schools already have the facilities for this type of training, and the ability to use a stop watch teaches alertness, observation and efficiency. Instruction along these lines should be given serious thought by vocational school administrators.

No vocational training program designed to serve the home-appliance field would be complete without training classes in electric appliance repair. The additional need for this type of training is not only necessary to bridge the gap between the peacetime production period and postwar resumption in the manufacture of appliances, but will also continue well into the postwar period.

The serious shortage of appliance repairmen has been recognized by our government with the recent announcement by War Manpower Commission Chairman, Paul V. McNutt, of a nation-wide program for training refrigeration repairmen. In order to alleviate the shortage of experienced repairmen, the government program will make available three principal types of training:

1. Evening courses for new workers employed as trainees in the refrigeration industry.
2. Paid, full-time training for workers on local contractor payrolls.
3. Vocational courses for high-school seniors in regular vocational school programs.

All these types of training, covering 200 hours of classroom and laboratory work, have been worked out by the United States Office of Education, the War Manpower Commission Training Bureau, and the National Refrigeration War Council. Special emphasis will necessarily be placed on selection of boys in the 16-17 year age group and men in 4-F as potential trainees.

As further evidence of this shortage, Westinghouse, up until last month, has conducted this year, at the request of distributors, over 200 service schools attended by over 6,000 individuals. Many of these men were dealer representatives. To meet this need, boards of education in various cities have also announced classes in electric appliance repair training. The announcement was recently made in Pittsburgh, Pennsylvania, that 606 men and women had received such training in their vocational schools within a period of one year. In many of the adult service training classes, men who have sold appliances for years are now learning how to repair them. In other words, the electrical appliance business has changed from sales to service. Although during the

war period much of this service training is necessarily confined to adults, the postwar period will find high-school boys and girls who have had such vocational training available for jobs with distributors and dealers as well as with independent service organizations.

Such a training program should teach conservation and service, its main purpose being one of helpfulness to appliance users. It should be designed to educate students in the proper "care and use" of appliances to promote conservation of parts, and to provide quality service.

One thing not generally known is that Westinghouse, along with certain other appliance manufacturers, has available for vocational school use material for service training programs. This material consists of service guides, sound-slide films, charts, display boards, etc. These service guides cover both major and minor repairs of every description and are illustrated throughout. They are well worth having in any vocational school.

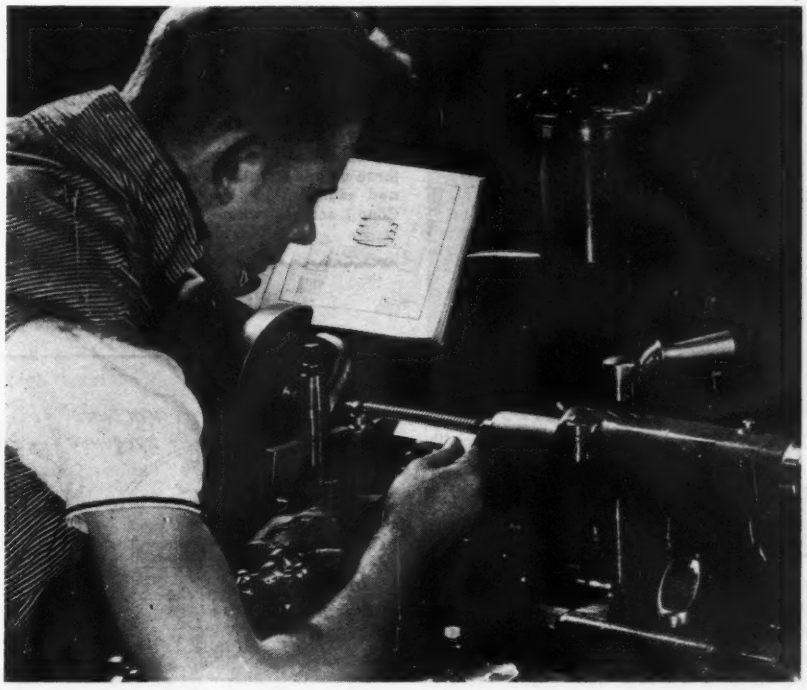
Every vocational training program designed to serve the home-appliance industry should include classes in the principles and fundamentals of electricity. Although this field may properly be considered the least technical in the electrical industry, it should require of every employe a knowledge of the fundamentals of electricity. The girl on the assembly line who understands that the nicking of a strand of wire only serves to weaken it will have a better appreciation of the proper way to strip the insulation when such an operation is given her to perform. Likewise, the knowledge that the proper way to put a wire around a screw will make a tighter connection, reduce the electrical resistance, and eliminate a hazard, will at the same time make a better employe and one who will help produce a better product. A knowledge of such fundamentals would not only be of inestimable value to the manufacturer and the employe, but when carried into the home would permit the home repair of simple electrical connections at the same time.

Such courses should include a study of electrical measurements, electric circuits, electricity in the home, electric appliance motors, mechanical elements of motors, common enemies of motor life, and safety.

We should not overlook vocational training in the fields of salesmanship and distributive education. Advanced information on consumer goods in the postwar economy emphasizes this point. Most of us are of the opinion that the developments in design materials, and construction of products in every industry touching our daily lives, such as building, metals, appliances, etc., will surpass those of pre-war standards. Similar progress may be expected in all fields of human endeavor. It is only reasonable to expect that the technics of selling and distribution will be as exacting in their fields as are the various crafts. Vocational training in schools can contribute in an important way to the basic education of the student in these fields, thus preparing him, or her, for the specific and individual training which will later be received from the employer.

Of particular importance in the field of home appliances is the subject of home economics. From the professional standpoint and in view of the anticipated postwar expansion in this field, home economists are going to be in demand by public utilities, distributors, and dealers as well as for the teaching profession. Since the outbreak of the war we have become conscious of the vital role that nutrition plays in the strength of our nation. To further this role in the postwar era, the teacher of home economics has a three-fold job to do in teaching how: (1) to buy food correctly; (2) to preserve food properly; and (3) to cook food scientifically.

In talking with Mrs. Julia Kiene, Director of Home Economics Institute of Westinghouse and nationally known as the founder of the Health for Victory Clubs, I learned of some new angles related to the subject of future vocational education with respect to women. Mrs. Kiene and her staff are already aware of definite reactions among women directly resulting from the wartime use of womanpower. Experience of women workers in industry today is producing a situation, not an obstacle or a problem, but a situation, which manufacturers of home electric appliances and vocational teachers must meet tomorrow.



One of the greatest demands in postwar industry will be for all-around machinists, states the author, because of the disruption in the apprentice program by the war and the retirement of many skilled craftsmen.

Have you thought of the results of woman's impact with system in industry? There are hundreds of thousands of women who are learning in their wartime jobs, the value of system, production-line methods, and the importance of good building and careful inspection. They are going to take the lessons learned on the job into their homes. The result is that the things you have been pioneering in the classroom and the things industry has been talking about and trying to sell are suddenly given a tremendous boost.

Knowing the advantages of systematic routine as she learned them in a war plant, the postwar homemaker will want and demand the same advantages in her

(Continued on page 30)

Building a 36-Inch Globe

BY *Walter Forschler* AND *Worsley Fardy*

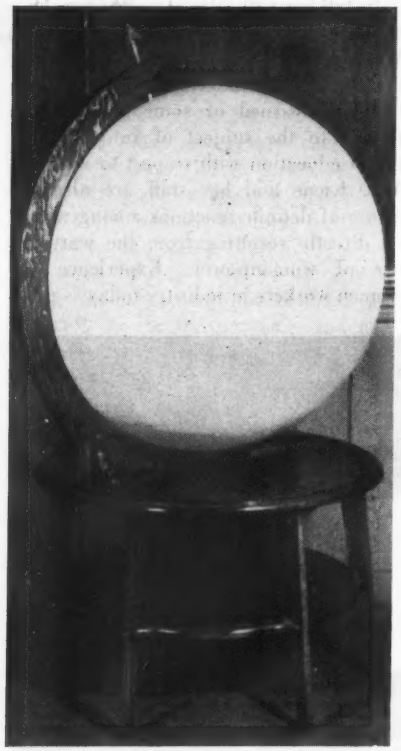


Illustration I—Completed 36" globe and stand without geographical markings.

Correlation is a big word in education today. This project offers the opportunity of putting it into practice. The present day interest in world events, aviation, history, and geography makes a globe particularly timely. Four of these globes have been completed by seventh- and eighth-grade students in the Norwich, Conn., schools where the authors teach industrial arts.

BECAUSE of the widespread interest in global geography and the necessity for geographical orientation in the study of world events, our superintendent, Mr. Thomas W. Mahan, suggested that shop students build large globes for use in other classes. The industrial arts department readily took up the challenge and plans were worked out for the production of at least seven 36" globes and mounting tables.

Plans and processes were formulated with the skills and abilities of seventh- and eighth-grade industrial arts students in mind. Construction work was carried out on a production basis. Our shop contains only hand tools but the project could be easily worked out with power tools.

The construction was broken down into three major divisions: building a form for the globe, actual construction of the globe itself, and building a mounting table.

Building the Form

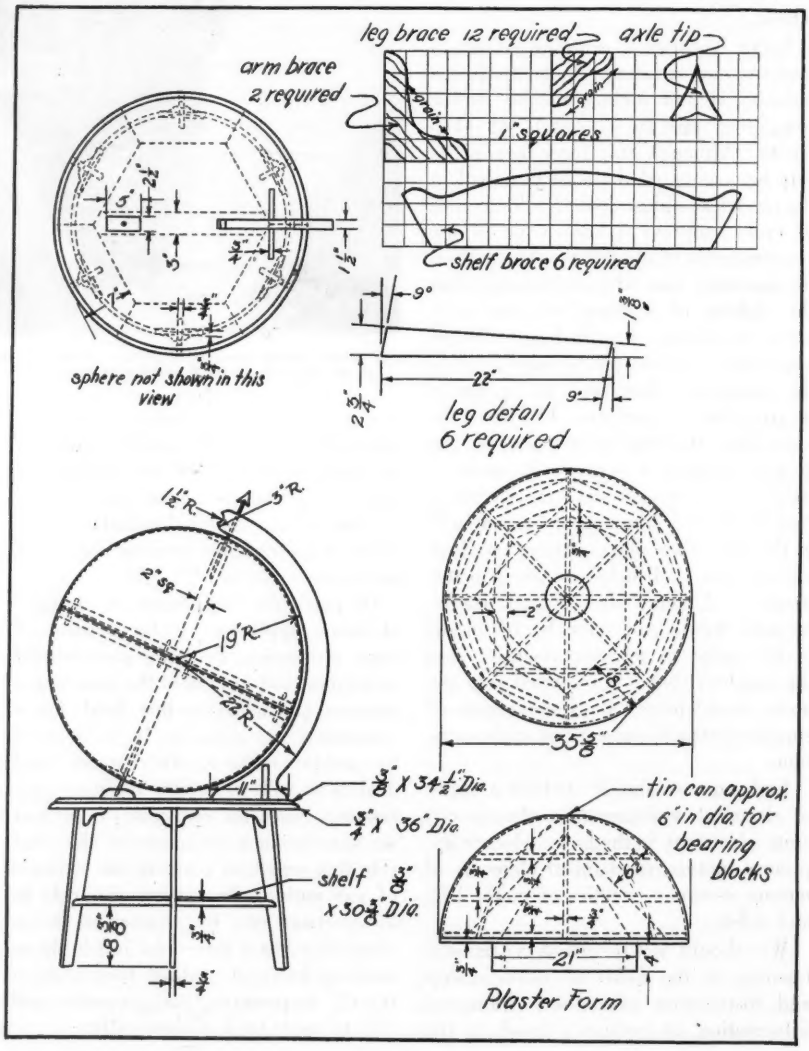
The plaster form about which the hemispheres were formed of chipboard is shown in Diagram 1. It was built up by fastening eight ribs on a ¾" thick circular base made up of four segments. The ribs were joined by three rows of parallel segment braces. The outer edges of the lower row of braces were cut and beveled to an arc of 34⅝" diameter. The braces in the other two rows were cut and beveled so that they would conform to the contour of the hemisphere.

A tin can approximately 6" in diameter was cut down to a ½" depth and recessed in the top where the ribs met. The can made a holder for the wooden bearing block used in forming the chipboard hemispheres as noted later. It also held the block on the end of the sweep knife used in forming the plaster hemisphere.

The wooden assembly was then mounted on a platform which was fastened to the top of a 25-gallon steel drum, used as a stand.

The ribs and parallel segments were then covered with V-shaped gores of

Diagram 1.



1/8" hardware cloth. Two coats of plaster of paris were then applied over the hardware cloth to a combined thickness of 1/2". The first coat, about 3/8" thick, was made by mixing finely sifted sand with the plaster of paris. The second coat was made without the sand. Both mixtures had vinegar added to retard the rate of setting of the plaster.

A sweep knife as shown in Diagram 2 was used to smooth down the second coat of plaster. This knife was also used as a gage for the thickness of the first coat. The sweep knife was fastened to a circular block which rotated in the recessed can and was made to swing around the circular base of the form.

When the plaster had set, the form was ready for the construction of the hemispheres.

Building the Hemispheres

The method of forming the hemispheres out of V-shaped gores of chipboard is shown in Illustration 2. The hemispheres were built up of three layers of chipboard with 18 gores in each layer. Chipboard can be secured from paper supply houses. Developments were worked out for gores of two sizes, one a quarter of an inch oversize all around which was trimmed after being applied to the hemisphere as noted later. Although the diameter of the last layer of chipboard was larger than the first layer, gores of the correct size for the last layer were used for the first two layers in order to simplify construction. The trimming process as noted later resulted in the correct size of the sphere.

Materials used were as follows: chipboard .056 x 30" x 40"; waterproof casein glue; newspapers; bearing blocks; No. 6 x 1/2" carpet tacks; and 1 1/4" No. 16 wire nails.

The following steps were followed in forming the hemispheres:

1. Cut 54 developed-size gores and 54 oversize gores from chipboard. Both should be from 2" to 3" longer than true length to allow for shrinkage and trimming. The above number of gores is required for two hemispheres.

2. Cover the entire surface of the plaster form with a thin layer of oil or other lubricant.

3. Cover the entire surface of the form with pieces of newspaper. This will prevent the hemispheres from sticking to the form.

4. Place wooden bearing block into cup formed by the tin can in the top of form.

5. Soak a regular-sized gore in medium hot water for about three minutes. Too much soaking causes the chipboard to disintegrate.

6. Remove from water and apply a liberal amount of waterproof casein glue to that part of the gore which will be attached to the bearing block as noted later.

7. Start soaking a second gore so that there will always be one soaking while working.

8. Place gore, still wet, on form and fasten to bearing block with two No. 6 x 1/2" carpet tacks. The tacks are to be left in.

9. Drive a 1 1/4" No. 16 wire nail through each gore into the bearing block about 2" from the center of the bearing block to serve as hanger for muslin used in shaping the gores as shown in Illustration 2. The nails are removed after each layer is applied.

10. Hang muslin strips on nail near edges of gore with about 6 lb. weights attached as shown in Illustration 2.

11. Space off with dividers from edge of last gore 1/18 of the circumference of the base of the form.

12. Start the next gore at this point.

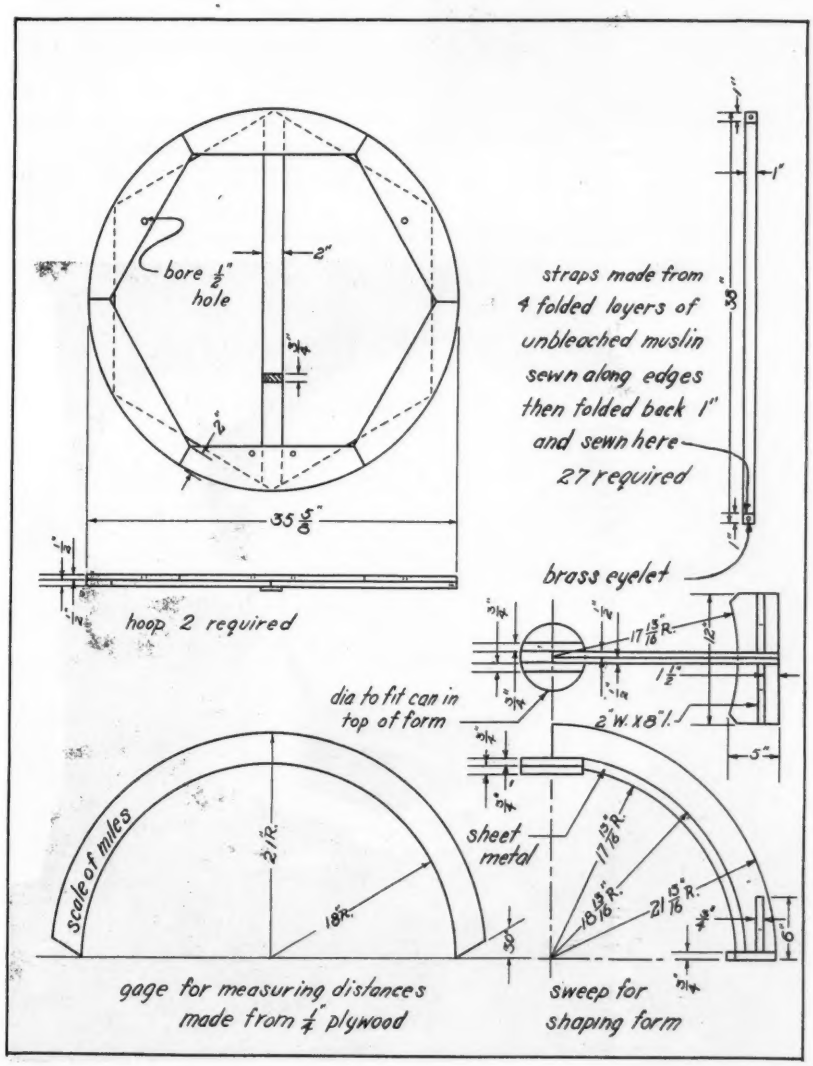
13. Repeat steps 5 through 12 until there is a gore and a space alternately all the way around the hemisphere.

14. Tack all gores loosely at the base of the form to prevent them from shifting. Tight or firm tacking at this point will cause the gores to tear apart.

15. Allow from two to three hours for drying. If the work is done in a warm room, one hour may prove sufficient.

16. When the first set of gores are dry, the oversize gores are to be fitted into the spaces left.

Diagram 2.



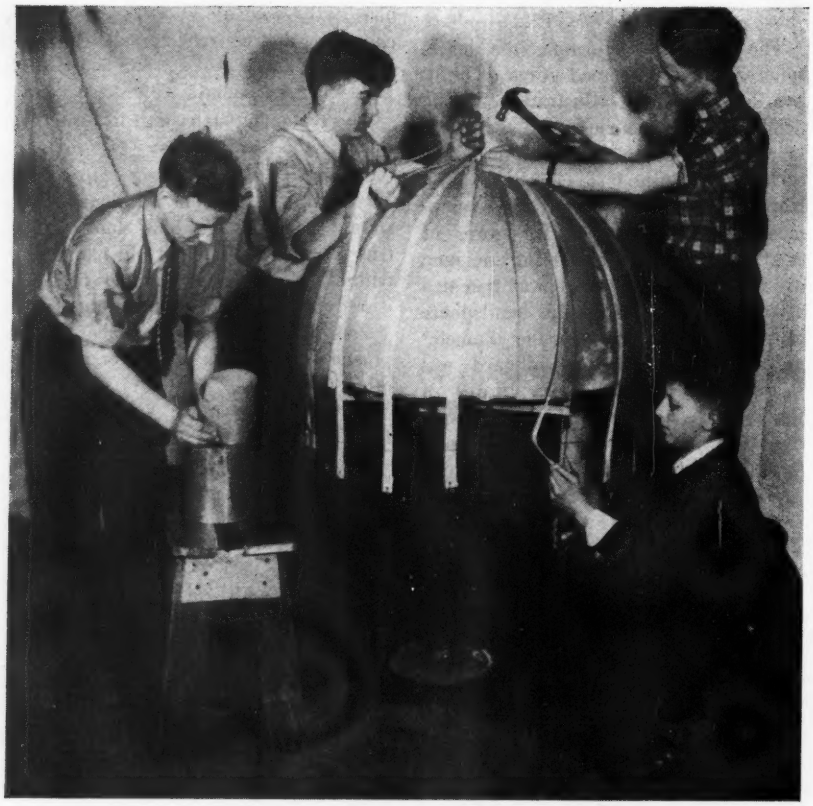


Illustration 2—Applying chipboard gores to the form.

17. Remove the muslin strips and weights only as work progresses. This prevents the gores from twisting out of shape.

18. Soak an oversize gore for three minutes in medium hot water.

19. Place this gore while still wet on form over space between first two gores so that it overlaps both gores equally.

20. Hang muslin strips with weights along edges from nail in center of bearing block. (It may be necessary to use three strips and weights to hold the gore in place.)

21. With a paperhanger's seam roller, press hard along both edges. This produces two lines on the underside to which the gore is trimmed.

22. Remove gore and trim to lines.

23. Apply glue and fasten as in 8, 9, and 10.

24. Hang muslin strips to overlap both gores as in Illustration 2.

25. Repeat steps 17 through 24 for the remainder of the layer.

26. Allow to dry overnight.

27. Glue a piece of cheese cloth about 4" in diameter over the center where all gores join together for additional strength. Repeat also after the second layer.

28. Remove tacks from base of gores as work progresses.

29. Second and third layers are applied in the same manner as the first layer. However, casein glue is applied to the entire surface of the gore and space where it is to be placed.

30. Break joints with the second and third layers so that no two come directly in line. To do this start the second layer one-third of the width of the gore and the third layer two-thirds of the width of the gore from the first-layer seams.

31. To prevent the gores from twisting out of shape, which they will do easily, the layers should be built up as rapidly as possible. One layer each day for three consecutive days will produce excellent results.

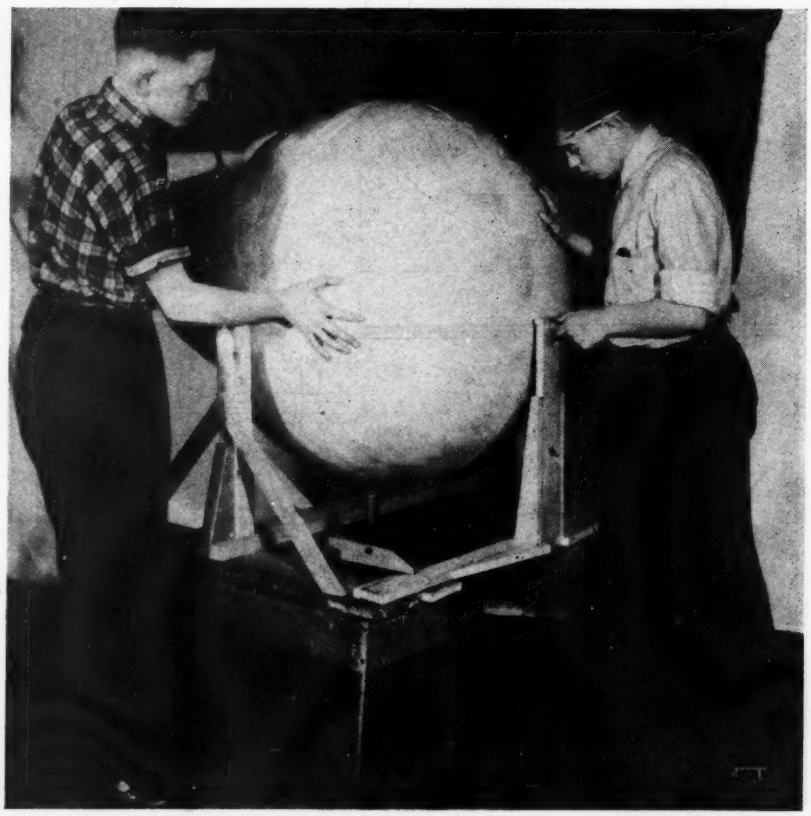
32. Dry for about two days after third layer is applied. Then remove weights, strips, nails, and tacks in base.

33. Set the tacks in the top of the hemisphere with a large nail set.

34. With a sharp pencil mark a line around the inside of the hemisphere at the base of the form. This line is used in trimming the hemispheres to size and locating the position of the hoop.

35. Some difficulty may be encoun-

Illustration 3—Trimming the hemispheres by use of fixtures.



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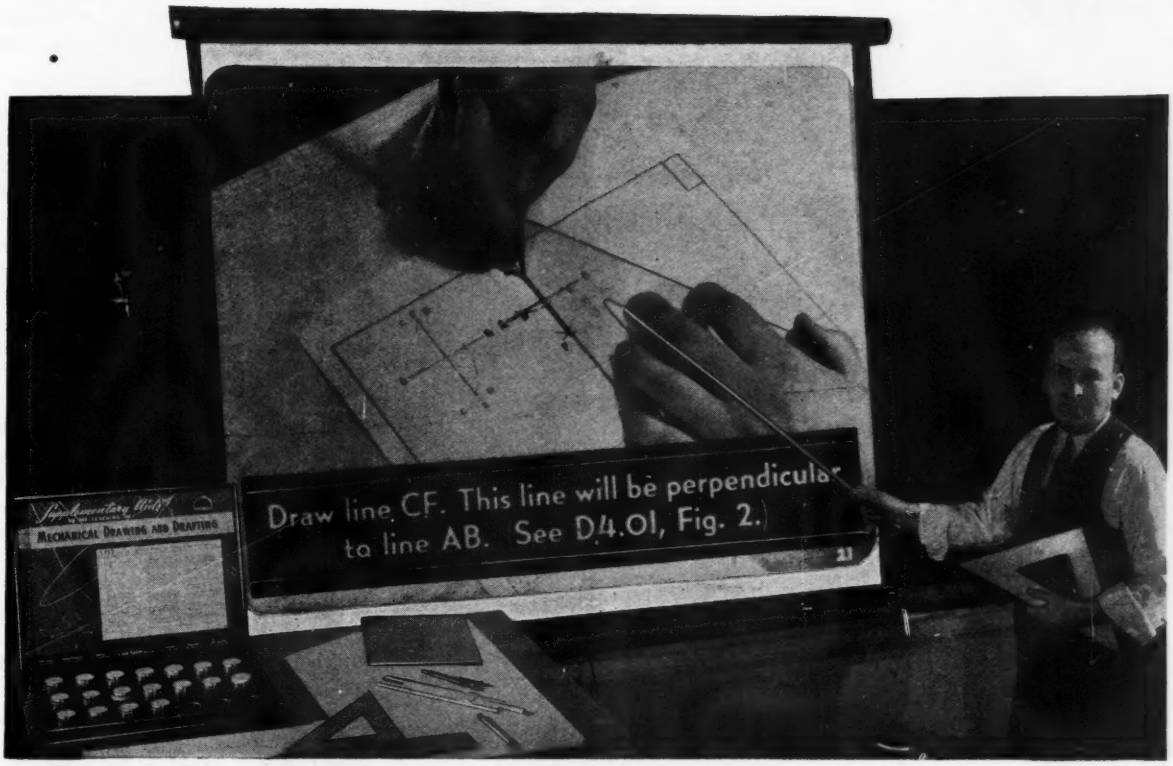
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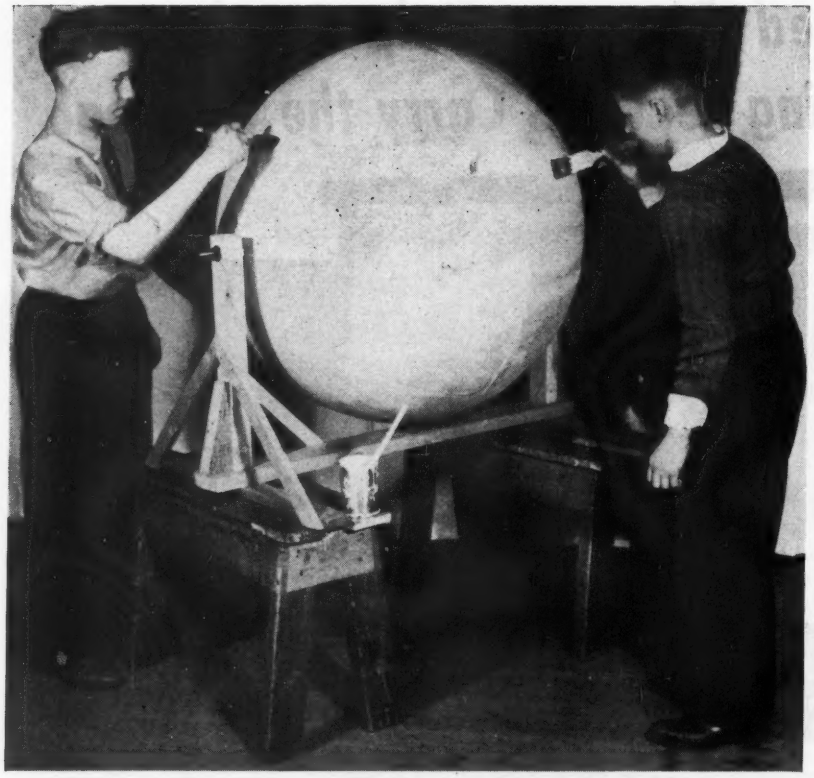

Illustration 4—Painting the globe.

tered in removing the hemisphere from the form as a great deal of shrinkage takes place in the drying process, causing it to fit tightly to the form. However, if it is handled carefully it will slip off without breaking.

36. Make a rough saw cut ½" to ¾" outside the line drawn in operation 34.

Assembling the Globe

The hemispheres were nailed with 1¼" No. 16 wire nails to hoops placed ¼" below (or bearing-block side of) the line previously drawn on the inside of the hemisphere. (See operation 34.) The nails were set so that the heads could be covered later.

The two hemispheres were fastened to one another by ½" dowel pins fastened to one hoop and fitting into holes in the other. This construction feature allows the globes to be readily assembled or disassembled so that they can be taken through doorways of narrow width. The weight of the hemispheres holds them together.

Central axle pieces of 2" square wood were fastened between the hoops and the pole-bearing blocks. Half-inch holes were bored into the pole ends of these central axle pieces from the outside of the globe to a depth of 6". The holes at each pole of the globe were drilled to the same depth so that it could be reversed in the support. This is helpful when drawing the geographical outlines on the finished globe.

Illustration 3 shows the two jigs used in trimming the hemispheres to the line drawn in operation 34. The trimming is done on the lathe principle. A sloyd knife is held firmly in a slot at the top of the tool post (boy at right). Spacing blocks 1¾" thick are inserted between the hoops on the dowel pins which hold the hoops together. These blocks separate the two halves of the globe. This steadies them and allows the halves to be trimmed parallel to one another.

Illustration 4 shows the construction of the painting jig. The bearings were constructed as follows. Two ½" x 8" machine bolts were threaded to within ½" of the head. The head was then cut off and the other end slotted for a screwdriver. Nuts were countersunk and clamped with flat pieces of iron to the inside of the jig uprights. This allowed the bolts to be threaded into the globe bearings with a screwdriver. Lock nuts hold the axles in position after the globe halves have been forced close together. The uprights on this jig are 40" apart.

Two axles, made by waxing undersized ½" dowel rods, were set to hold the globe in the supporting arm and the bearing block on the table. (See Diagram 1.) The axles were placed at an angle of 23½°, the same as the earth's axis. The upper end of the axle is finished in the shape of an arrow head.

Table for Mounting

Diagram 1 shows the construction details on the table. The design was planned so as to use production methods of construction. Joints were of the butt type and parts were assembled with screws and glue. This design was practical as it met the abilities of average seventh- and eighth-grade students.

The style of the legs gives the table stability and allows for a shelf that may be used for magazines and maps.

The supporting arm for the globe was built up of two outside layers of ⅜" fir plywood with a ¾" pine core in segments with the grain running so as to give maximum strength. The arm was bolted to the top by round-head stove bolts and wing nuts for easy assembly and disassembly.

The top and shelf were made of ⅜" fir plywood. The six shelf braces or leg stretchers form a rim which gives thickness and stiffness to the shelf. The top has a rim made up of six under segments to which the legs and leg braces were fastened. A 3" wide center piece was also mounted underneath the top to give additional support to the arm and bearing block of the globe.

Finish

The table and arm were given a regular stain, shellac, and wax finish. The hemispheres were given two or three coats of varnish on the inside to prevent the absorption of moisture. The seams between the gores were filled with a mixture of casein glue and one of the commercial powdered crack fillers, then sanded smooth. A base or sizing coat of thin shellac was then given to the entire outside surface of the globe. The final finish for the outside of the globe depends somewhat on the use to be made of it by the geography classes. A combination egg-shell finish with bodies of water in light blue works out well or a blackboard or slate finish can be used which will take chalk markings.

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Industrial Arts and Liberal Education

BY *Leon Mones*

There is considerable value in an occasional pause for re-evaluation of objectives in teaching and reassessment of accomplishments to date. The ten points discussed by the author will help in the process. Leon Mones is principal of the Cleveland Junior High School, Newark, N. J. This article originally appeared in the "Industrial Arts Teacher," official publication of the American Industrial Arts Association.

WE who believe we know the value of industrial arts in a program of liberal education must be bold and alert in revealing the fallacies and misinterpretations of those who do not choose to love us or understand us.

Those who do not love us tell us so quite frankly. They are the hostile legions of academicians, educational feudalists, literati, classicists, and intellectual cultists who accuse us of vulgarizing the aristocratic traditions of education. Some of these people are well meaning enough, but they don't try too hard to understand us. They hug the notion that we who sponsor the industrial arts are Philistines, vandals, or industrial bulls in academic china shops. Sometimes they are tolerant enough to concede that industrial arts can offer some help in the schooling of dullards and some relief from the mental exertion of real education.

To the well meaning among our critics we must insist that we are fully as devoted to the inspiring ideals of liberal education as are Presidents Hutchins and Barr, and Dean Gildersleeve. We are certainly as unanimously eager to emancipate intelligence, to develop cultivated discrimination, to refine emotions and attitudes, to create poise and selfcontrol as are any of the classicists or traditionalists. In fact, we are convinced that these are just the things we can do by means of industrial arts education.

Our point is simply this. We do not differ from the traditionalists in basic aims and objectives. Not at all. We believe, as they do, that a liberal education should develop mental power, articulate expression, conscious appreciation, and principled taste. And we insist that by skilful education revolving about industrial arts we can do just these things, and this point of view we must continue to explain patiently and tactfully, again and again.

"Industrial arts as a program of education is as appropriate and valuable for our gifted as for our deficient pupils."

But there are among our detractors some who are not so well meaning; these will continue a campaign of educational derision out of sheer ill will. These are the snobbish, the antidemocratic, who can't gracefully renounce the medieval tabloid of the high-blooded, aristocratic scholar-gentleman. They are the educational reactionaries, the nostalgics who enjoy belonging to various cults of precious and exquisite privacy. They exist in every age and dub themselves a variety of names. They shrink from the infection of the material, of the mechanical, of the practical, and they believe that the intellectual salvation of man can lie only in some topflighty mental excitement they call culture. They do not understand that real culture is the sum total of everything that man has devised to make his life wiser, cleaner, happier, richer and more comfortable. And they are especially obtuse in understanding that education has become a democratized enterprise in trying to make the realities of life better and wiser.

But curiously enough, even in our own camp we have colleagues and brothers who only partially appreciate our position. We have, for instance, our well-disposed but rather confused cothinkers who do not clearly differentiate between vocational education and industrial arts. To such as these we say frankly and honestly, "We are all in favor of vocational education. We do not oppose it at all. But let vocational education fly its own banner and stand on its own feet. Vocational education is very definite training in the use of a skill that can be sold on the market. It is good training and worthwhile training. It is training that takes brains, and interest, and application on the part of the teacher and the learner. More power to it, and if necessary, more financial subsidy. But it is not industrial arts education. Vocational education is a selective type of training for the selected ones who want it. Industrial arts education is a broad, comprehensive, liberal education for everybody, even for those who will later select vocational education—as who will not."

Then there are some among us who are still fond of declaring that industrial arts education is a fine educational prescription for those of low mentality, low power of concentration, low degree of interest and motivation. These friends

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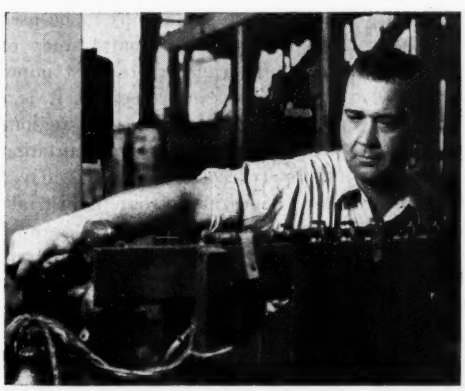

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of ours are fond of arguing that pupils who make no satisfactory adjustment in the traditional classroom can be sent to the refuge of the industrial arts shop, where the rather low type of mind can find suitable occupation. To be sure, there is something to this, but the truth must be seen in reverse. The truth is that industrial arts education is not by its nature especially geared to intelligences and personalities of low order and degree. The fact is that the values of industrial arts education are so comprehensive in scope, so attractive to all types of pupils, those of high intelligence and the dullards, of high mental gifts or low mental gifts, that all pupils will make better accommodation to a focus of industrial arts.

It seems to me that what we ought to do, and do very forthrightly, is to set ourselves formulating certain basic definitions. We ought to formulate our position in a series of theses or propositions, and I am offering ten. It is to be expected that not all of us will see eye to eye, and that not all of us will be ready to cast ballots in favor of these; but it seems to me that it is along such lines as the following that our thoughts should go if we wish to develop industrial arts as a dynamic area in education.

1. The values of an industrial arts program in education are those usually thought of as liberal. Tool skills, mechanical knowledge, vocational skills, will of necessity be achieved. But these are fundamental to such educational products as insight into social life, ability to communicate with others, etc., which an industrial arts program can develop.

2. An industrial arts program can be made a basic and fundamental core of an integrated and extended program of education. Arising from industrial arts, activity can develop mathematical, linguistic, and appreciative powers and skills. Reading, writing, calculating, speaking, judging, planning, and other such activity aspects of sound education can be made strong concomitants and outcomes of an industrial arts program if we emphasize not tool skills in themselves, but the whole aura of education enrichment and competency that can be made to surround basic industrial skills.

3. An industrial arts program is uniquely and peculiarly appropriate as an educational basis in a modern democracy. All of us owe our welfare, our comfort, our economic security, our social status, to the output of tools and machines. Man must learn to master machines and not permit machines to master him. An industrial arts program can aim to teach man so to adapt himself to the existence of machines as to learn how to control machines for human welfare instead of permitting machines to disrupt human life by flooding it with an unmanageable overabundance.

4. An industrial arts program can educate pupils toward the greater industrial age of the future. We cannot educate for an age of science and machines by encouraging an educational retreat from machines. We cannot educate for an era of material welfare through any traditional escapes from the concerns of materialism. If our pupils must face the problems of materialism they can understand the problems by confronting them and dealing with them and mastering them. The materialistic becomes discreditable only when it remains inarticulate, uncivilized, uncouth, and egotistic. Beautiful poetry, inspiring philosophy, great music, and great social thinking can flourish from the soil of purposive materialism. Our modern ideas of education are based on this kind of spiritualized pragmatism.

5. Industrial arts as a basic educational program can lead to such sound educational powers as will make for economic competency, which, by the way, will be one of our immediate future problems. Through an industrial arts program pupils learn to explore the resources of the community economic life.

6. Industrial arts as a program of education is as appropriate and valuable for our gifted as for our deficient pupils.

7. Such definitive skills as reading, writing, calculating, debating, explaining, judging, as well as the more subtle skills that we can designate as social adequacy, which include the skills of cooperation, of tolerance, of manners, etc., can all emanate from an industrial arts program.

8. An industrial arts program can well be a solid foundation for any type of higher education.

9. An industrial arts program should not be formulated by considering initially the kind of shops to be used. It should be derived from a study of the basic industrial factors most important educationally in a region. It is quite conceivable that in certain regions agriculture, in others transportation, in others hydroelectric power, may form basic concerns in our industrial arts program.

10. An industrial arts program, in summary, may be defined as a program of education which will develop in a pupil all the basic individual and social powers and skills, and which will be achieved around a core of industrial experiences significant to a pupil because they are fundamentally important to the time and place in which he lives.

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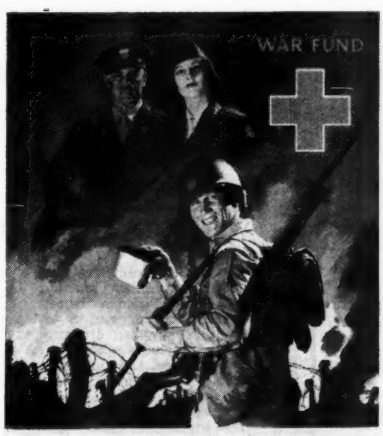

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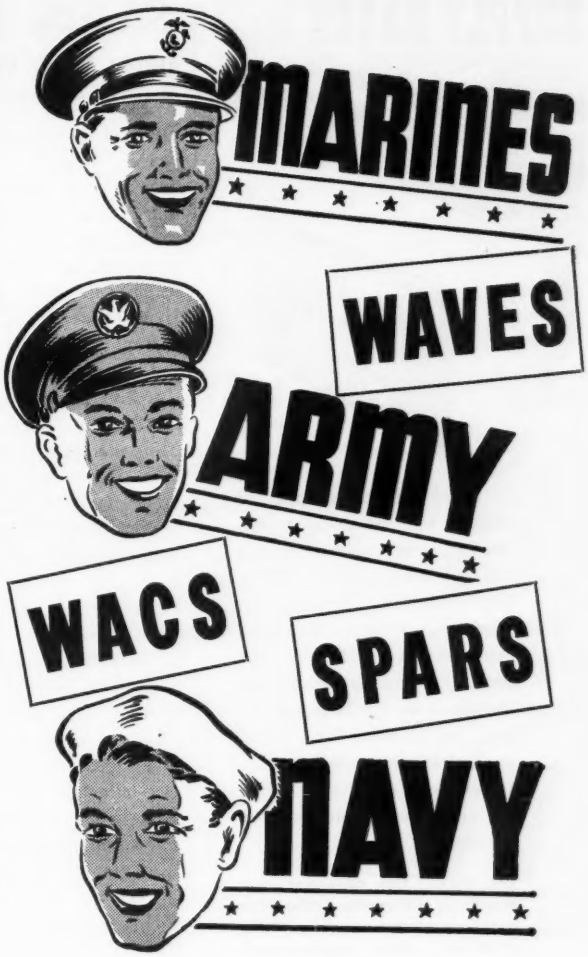

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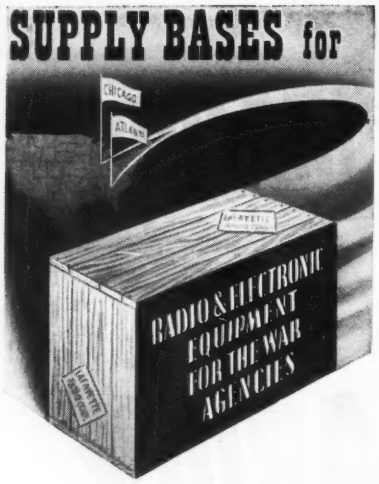

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FRANCIS G. CORNELL, for the last three years Assistant Director of VTWPW, has been appointed Chief of the Research and Statistical Service, Vocational Education Division, U.S. Office of Education, succeeding the late GILES M. RUCH. . . . HENRY B. MCDANIEL is now California State Vocational Director. Replacing him as vocational guidance director and psychologist for the San Diego city schools, is ANNA CATHERINE MOSER, formerly of the Montana State Teachers' College. . . . L. E. HAYES, head of the industrial arts department at the Stonewall Jackson High School, Charleston, W. Va., has been inducted into the armed services. Replacing him is ANDREW K. AULT. . . . FRANK C. CAMPBELL has accepted the position of senior education supervisor in industrial arts with the New York State Department of Education. . . . New director of the School and College Division of the National Safety Council is FORREST E. LONG, chairman of the Department of Secondary Education at New York University and editor of *The Clearing House* since 1929. MARIAN L. TELFORD, whom he succeeds, has joined the National Safety Council's Field Organization Department. . . . RICHARD WARREN of Niles, Mich., replaces ED BAILEY as coordinator of apprentice training in the Ann Arbor, Mich., High School. Mr. Bailey has been named coordinator in the Wayne, Mich., schools. . . . VICTOR J. SMITH has left Sul Ross College at Alpine, Tex., to join the Department of Teacher Training at the Armored Force School in Ft. Knox, Ky. . . . WILBUR C. GETZ, director of industrial arts at East Aurora, N. Y., High School, has been appointed to direct the St. Lawrence University division of engineering drawing. . . . The New Castle, Ind., schools announce the appointment of GEORGE SODERBERG, of Stout Institute, to teach related work in the industrial education department. . . . KENNETH L. BURCH joins the Ann Arbor, Mich., High School staff as teacher of machine shop.

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THE MANUAL ARTS PRESS
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news

WHAT'S DOING IN THE FIELD OF INDUSTRIAL EDUCATION

POSTWAR planning is emphasized in the Annual Report to Congress of the U.S. Office of Education. "We must plan now," says U.S. Commissioner of Education John W. Studebaker, "to eradicate and to prevent adult illiteracy; to establish the right to minimum educational opportunities for all American children and youth. We must plan now to utilize the newer equipment . . . We must plan more fully to utilize the great natural laboratories of civic and vocational life through various forms of apprenticeship and supervised work experience. We must plan now to provide educational opportunities for returning soldiers and sailors and demobilized war workers. We must plan now for organized opportunities in adult education for all our citizens."

Use of visual aids in training war production workers has cut the training time by 25 to 50 percent, states the report. Each one of the 150 visual aid units produced consists of a sound motion picture, 10 to 17 minutes in length, a silent filmstrip, and a teacher's manual.

By July 1, 1943, more than 6 million men and women, including 20 percent of those employed in war plants, had taken war production courses in forging; sheetmetal work; automotive, aircraft, and electrical services; welding and other skills under the VTWPT program, according to the report. During 1943, 2,450,904 people were enrolled in these classes and 308,745 youth and adults took courses under the Rural War Production Training Program. In this same period Engineering, Science, and Management War Training programs enrolled 596,000 men and women in short courses given in colleges and universities.

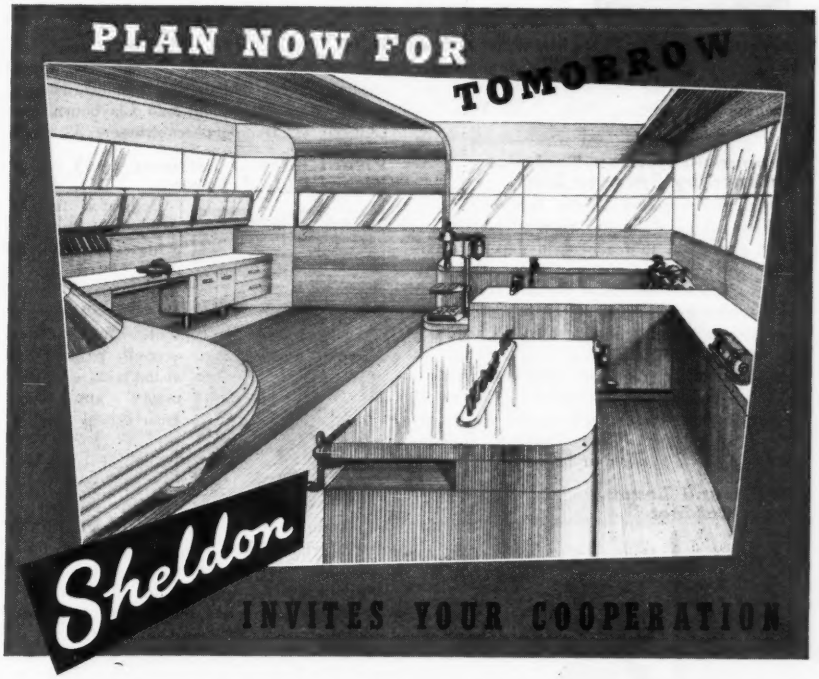
Vocational agriculture, business education, home economics, and trade and industrial education programs, administered under the Smith-Hughes and George-Deen Acts, had an enrolment of 2,629,737 students in 1942. Trade and industrial courses showed a trend toward greater enrolment of girls during this period. Apparent also was a growing need for schools which serve areas instead of communities.

APPRENTICESHIP and short-term training programs have been adopted by 3,300 more plants during the year ending November, 1943, Paul V. McNutt, chairman of the War Manpower Commission, announces. This is in addition to the 28,000 other plants which had the programs in operation prior to November, 1942.

ESTABLISHMENT of 22 new vocational institutes was on the $65,000,000 statewide educational program presented to the New York State Legislature late in January.

REDUCTION in prices on cemented carbide tools has been announced by Carboloy Company, Inc., as a result of additional manufacturing economies.

IN a message sent to the American Association of Junior Colleges at its 24th annual meeting in Cincinnati, President Roosevelt, emphasizing the importance of the junior college terminal curriculum courses for returning service men and women, said: "These men and women will wish, in many cases, terminal courses which combine technical or other vocational preparation with courses which assure a basic understanding of the issues confronted by them as American and world citizens. It seems possible, therefore, that the junior college may furnish the answer to a good many of these needs."



As the tempo of our war effort is accelerated the educational demands of war workers and returned fighting men places a tremendous additional load on the facilities of the nation's schools. Because of this, new plans must be made and additional equipment acquired. Tomorrow's plans are today's problems, and must be solved now if we are to meet the demands of the postwar period.

Sheldon Planning Engineers can help you plan your school shop. They will assist you in compiling budget estimates and writing specifications. Furthermore, Sheldon Planning Engineers can work out efficient and economical equipment combinations which will save time and money.

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. . . news from INDUSTRY

Basic Information on Coated Abrasives

Coated abrasives —types, manufacture, and uses— are discussed in this informative booklet just published by the Behr-Manning Corp. The well-illustrated booklet contains a comprehensive index; grit sizes and markings; and a comparative grading chart; as well as a list of trade names with product descriptions and uses. Available to instructors free of charge. Write the Behr-Manning Corporation, Troy, New York, *or check number 50 below.*

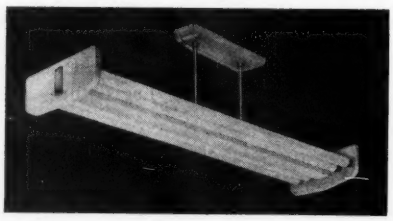
Opaque Projection Technics Outlined by Spencer Lens

Opaque Projection is the title of a new booklet published by the Spencer Lens Company as an aid to teachers in getting maximum service from opaque projectors. Procedures outlined are those already being used successfully by teachers at the primary, intermediate, and high-school levels. Sections are included on the delineascope as a diagnostic and drill device, on short exposure technics, and on special uses, as well as on types of screens and control of light in the classroom. Write the Spencer Lens Company, Buffalo, N.Y., *or check number 51 below.*

ATF Hand Lever Press Cabinet

The American Type Founders announce a new hand-lever press cabinet. Of hardwood finish, the cabinet contains a drawer with compartment for lever press rollers, a chase rack for four chases, and shelves for paper stock and miscellaneous items. The cabinet is designed to serve as a base on which to mount the lever press. For full details write the American Type Founders, Elizabeth, N. J., *or check number 52 below.*

New Four-Light Commercial Fluorescent Fixture



Designed by Mitchell Mfg. Co. especially for use in drafting rooms, this new fluorescent light requires four 40-watt lamps and provides cool and economical lighting. Easily installed by either suspension or surface mounting, individually or in rows. Completely wired; stroboscopic corrected. For full details write the Mitchell Mfg. Co., 2525 Claybourn Ave., Chicago 14, Ill., *or check number 53 below.*

Visual Review Pictures 1943 Visual Aids Progress

Dedicated to U.S. Army men and their achievements in the field of visual instruction, the *Visual Review—1943* presents an excellent over-all picture of visual aids and their many applications. Published annually by the Society for Visual Education, Inc., this year's book contains sections on PIT training in the schools, industrial utilization of visual aids, their use in war training and in various government departments, etc. Available without charge to any teacher or school official. Write the Society for Visual Education, Inc., 100 East Ohio St., Chicago 11, Ill., *or check number 54 below.*

Corlin Direct Reading Caliper with Scale

Accurate outside measurements can be read directly from the four-inch scale, graduated in 32nds of an inch, on this new Corlin caliper, whose spring tension automatically closes caliper around work. Invaluable for training students in accurate lathe work, pattern making, designing, drafting, etc. For full details write the Corlin Mfg. Co., Dept. S, 3201 Clinton Ave., Minneapolis 8, Minn., *or check number 55 below.*

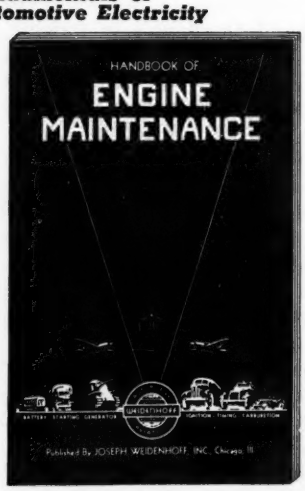
Films Available on Lease-to-Sales Contract

Encyclopedia Britannica Films (formerly Erpi Classroom Films, Inc.) announces a new plan whereby schools may secure a comprehensive library of films and arrange for the payments over a period of five years. Available under this rental-purchase plan are films on electrostatics, electrodynamics, elements of electrical circuits, sending and receiving radio messages, simple machines, thermodynamics, theory and problems of flight, light waves, sound waves, and many related subjects. Write for full details to the Encyclopedia Britannica Films, Inc., 1841 Broadway, New York 23, N.Y., *or check number 56 below.*

Dumore Bulletin on Thread Grinding

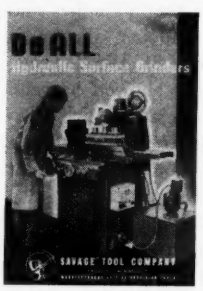
This instructional bulletin shows typical thread-grinding operations, samples of thread grinding done by the Dumore method, wheel dressing, and the six simple steps required to mount a Dumore tool-post grinder and thread-grinder attachment to a lathe. Complete helical angle tables for both U.S. Standard and Acme threads are given for settings on the grinder and dresser. Write the Dumore Co., 14th and Racine, Racine, Wis., *or check number 57 below.*

Fundamentals of Automotive Electricity



The Engineering Division of Joseph Weidenhoff, Inc., has compiled this informative book on the servicing of automotive vehicles, emphasizing the electrical phase of the work. Text is simple and concise with many illustrations and diagrams. For full information write Joseph Weidenhoff, Inc., 4352 West Roosevelt Rd., Chicago, Ill., *or check number 58 below.*

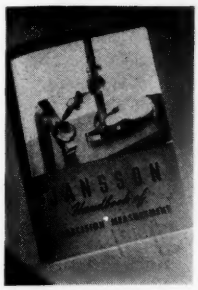
DoAll Hydraulic Surface Grinders



Latest catalog on DoAll grinders and accessories has just been announced by the Savage Tool Company. Catalog gives full specifications on all grinders now manufactured with examples of DoAll surface grinders in actual use also given. DoAll grinder accessories, including the coolant unit, dust collector, grinding wheels, etc., are

completely described. Write the Savage Tool Co., Savage, Minn., *or check number 59 below.*

Jansson Handbook of Precision Measurement

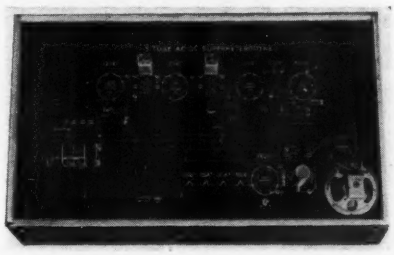


Written by Arthur Clifford in collaboration with Jansson Gage Company engineers, this instructive booklet contains chapters on the history of measurement, precision measurement, care and use of gage blocks, angle measurement, and the vernier. A catalog and price list of Jansson gage blocks and vernier instruments, plug and ring gages, flush pin and rightangle gages, and special snap gages are included. Write the Jansson Gage Co., 19208 Glendale Ave., Detroit, Mich., *or check number 60 below.*

Bradley Washfountains

A new catalog on school washfountains has just been published by the Bradley Washfountain Company. Various models of group washfountains, both full circular and semi-circular wall types, are illustrated. These washfountains are particularly suitable for school use since they provide clean running water for each person and yet each washfountain (of the 54-inch size) serves 8 to 10 people simultaneously. Write for catalog No. 4308 to the Bradley Washfountain Company, Milwaukee, Wis., *or check number 61 below.*

Lafayette Radio Develops New Training Board



This 5-tube AC-DC Superhet Demonstrator Board has been created by Lafayette Radio Corp. for radio and physics classroom purposes.

Designed schematically and colored in R.M.A. code, it has actual radio parts removeable for demonstration. Terminals are provided at all tube elements for measurement of voltages and signals, and jumpers are provided to open condenser, resistor, and coil circuits. Tubes included. Write Lafayette Radio Corp., 901 W. Jackson Blvd., Chicago 7, Ill., or 265 Peachtree St., Atlanta 3, Ga., *or check number 62 below.*

New Literature . . . . . .

Barrett Brake Service Equipment, fully described in their new catalog No. 44, includes: relining machines, hydraulic filler tanks, and brake-drum lathes, hones, and gages. Barrett Equipment Co., Cass Ave. at 21st St., St. Louis 6, Mo., *or check number 63 below.*

TECO Carbide Tools and Blanks. A new catalog illustrating cut-off, round shank, and special tools, as well as standard blanks and carbide tools. Complete specifications given for each type. Tungsten Electric Corporation, 540 39th St., Union City, N.J., *or check number 64 below.*

Dietzgen drawing instruments and materials are described in *School Catalog No. 43.* Drawing and tracing papers, drafting sets, and Directo outfits are included. Write Eugene Dietzgen Co., 2425 Sheffield Ave., Chicago, Ill., *or check number 65 below.*

The ABC of Electronics at Work explains clearly how electronic tubes function. Write Dept. 7 N 20, Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., *or check number 66 below.*

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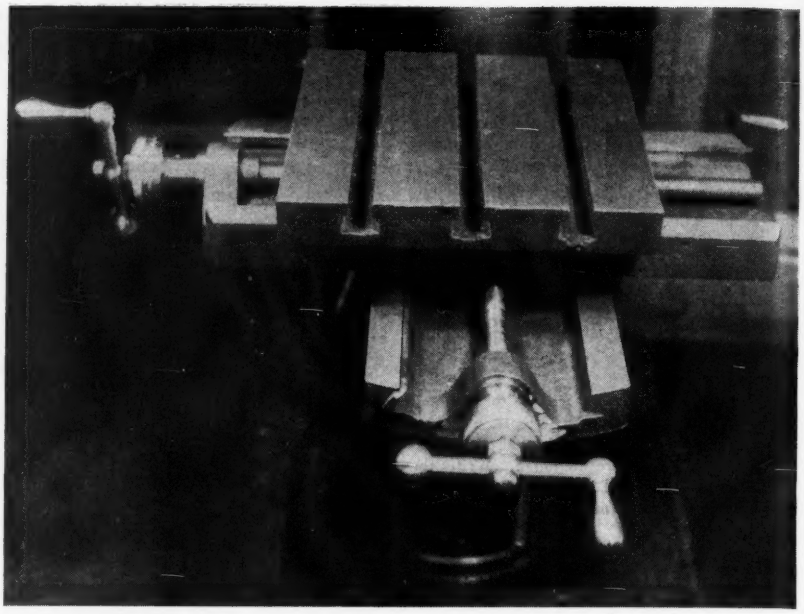
Drill-Press Attachment

BY *Sam Jenkin*

This machine-shop project involves numerous processes and technics and is exceptionally well adapted to the well equipped shop where advanced machine shop is taught. The end result is a very useful adjunct to the shop facilities of the school. Sam Jenkin teaches machine shop and welding in the Eveleth, Minnesota, Manual Training School.



TESTED PROJECT

THE above photograph and the drawings on this page and pages 22 and 24 depict an attachment that, for school shops not fortunate enough to have a radial drill press, will make it easier to do precision work on their present drill press.

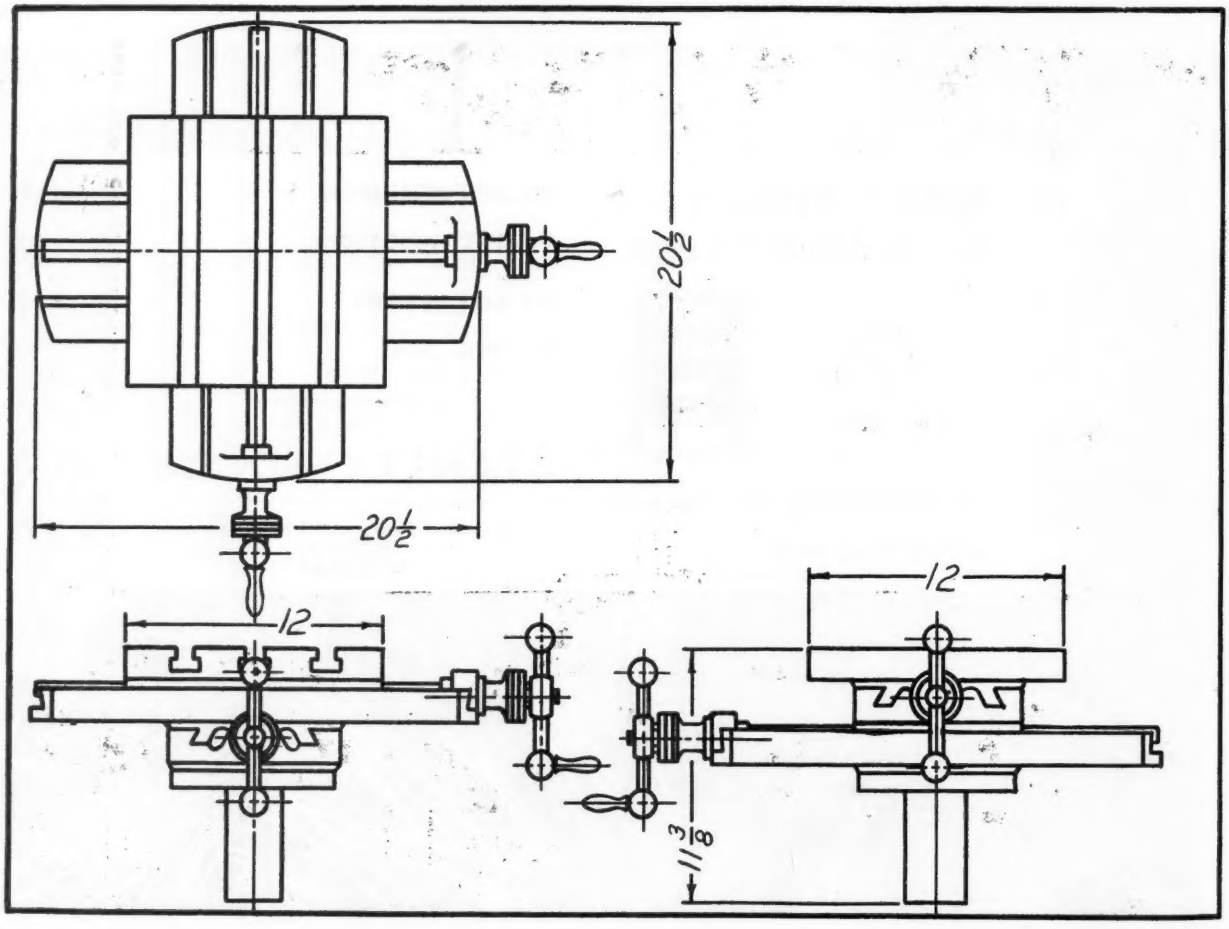
A wider range of work is also possible with this attachment. The graduated dials permit the accurate distancing of holes in jig work and other operations of a similar nature.

The attachment is so constructed that it is interchangeable with the regular drill-press table. When it is desired to use the attachment, all that is necessary is to lift the regular table off and drop this device in place.

The patterns and castings were made and the machining all done in the Eveleth Manual Training School shops.

The drawings illustrate the method of construction and show most of the details.

(Continued on page 22)



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MACKLIN
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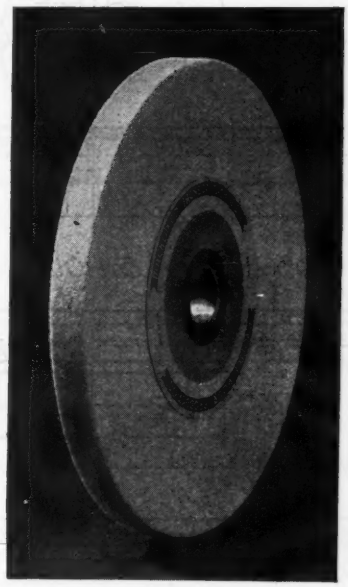
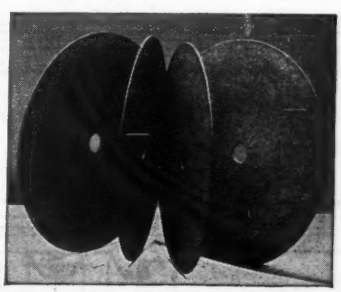


MACKLIN Grinding Wheels are made in all sizes and shapes, all grain and grade combinations for use on all kinds of grinding jobs. There are particular Macklin Wheels designed for special use in school shops that will give long life while grinding efficiently and economically. School Shops throughout the country are finding the new Macklin Booklet—"Helpful Hints and Safety Suggestions" extremely instructive. Write for your copies.



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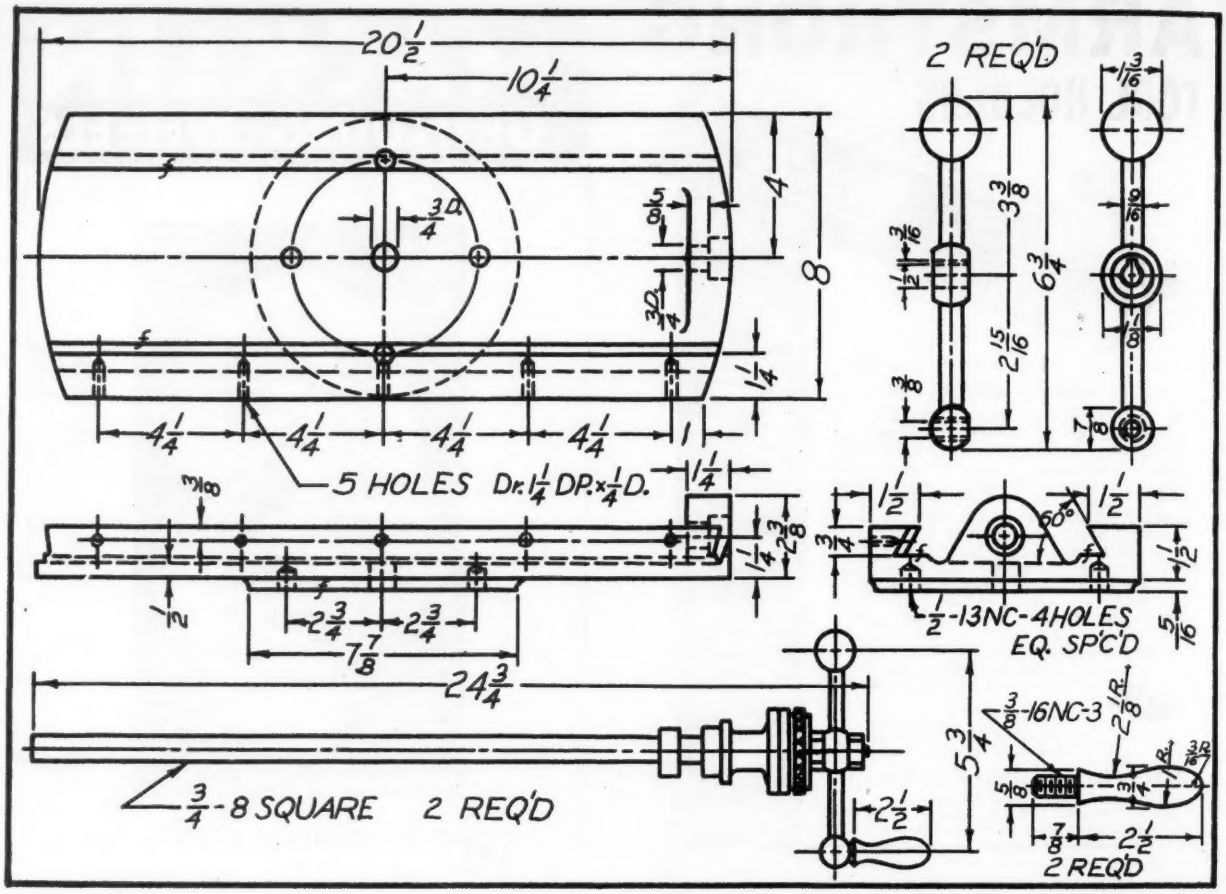
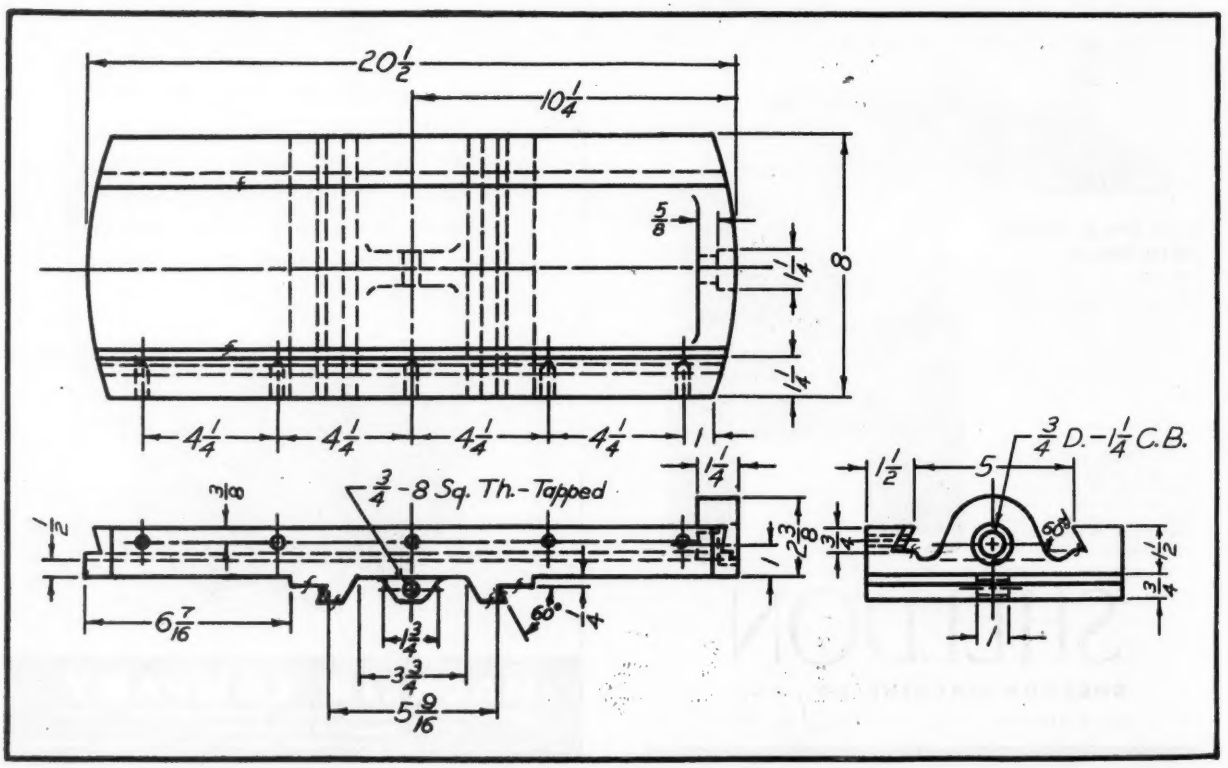


Drill Press Attachment

Continued on page 24



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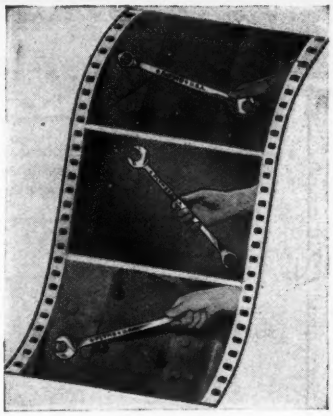

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106—Hacksaws	18

As a contribution to the war effort this series of training films has been prepared under the supervision of the United States Army Ordnance Department. Originally intended only for use in military training centers these pictures are now being made available to schools and general industry at cost. For complete information, address —

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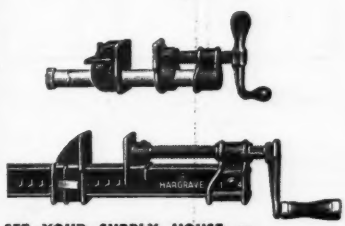

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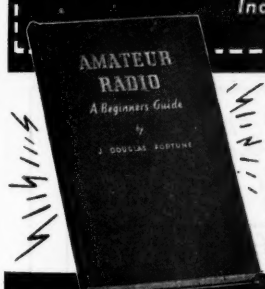

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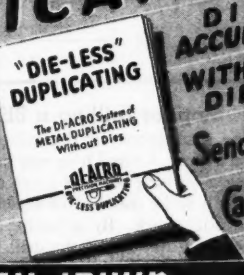

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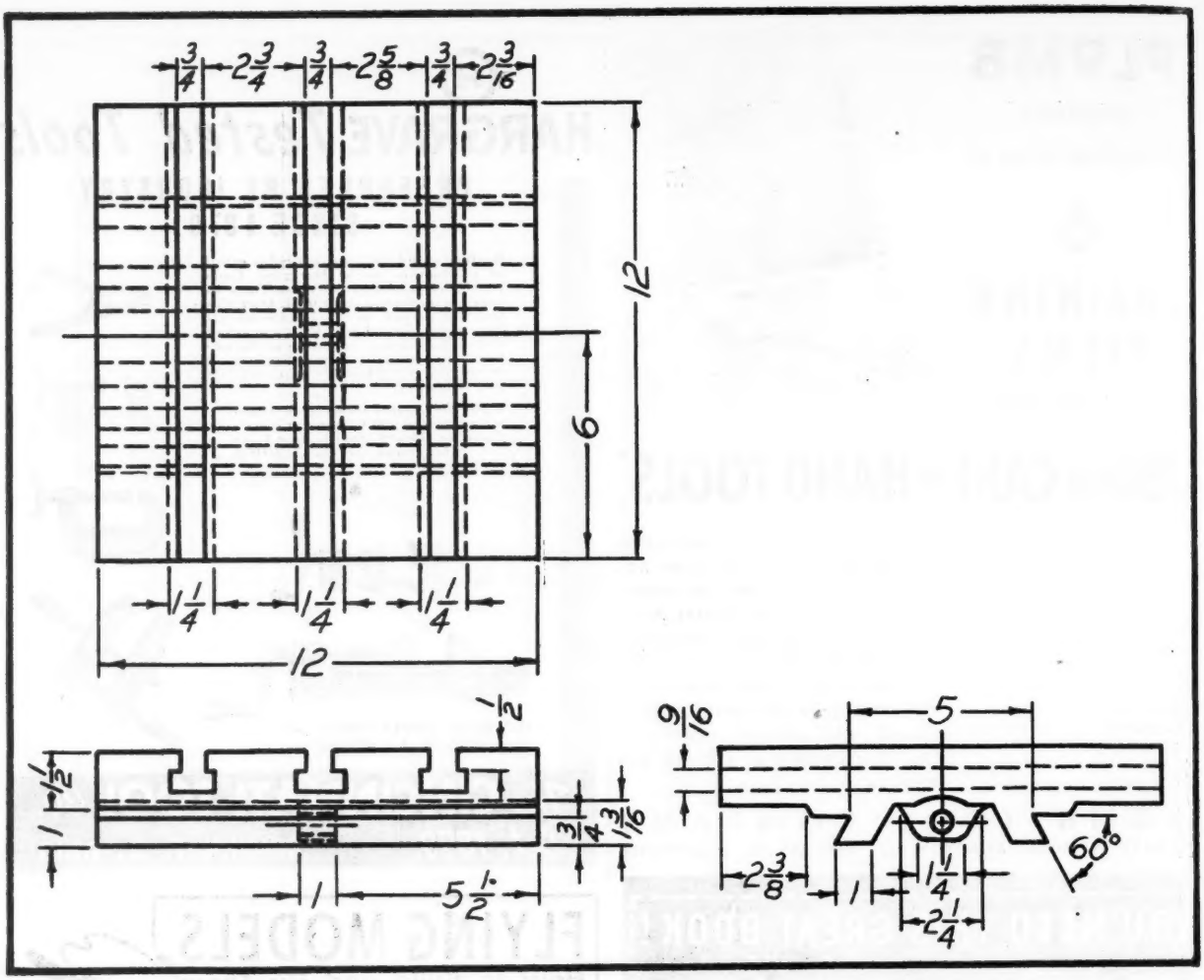
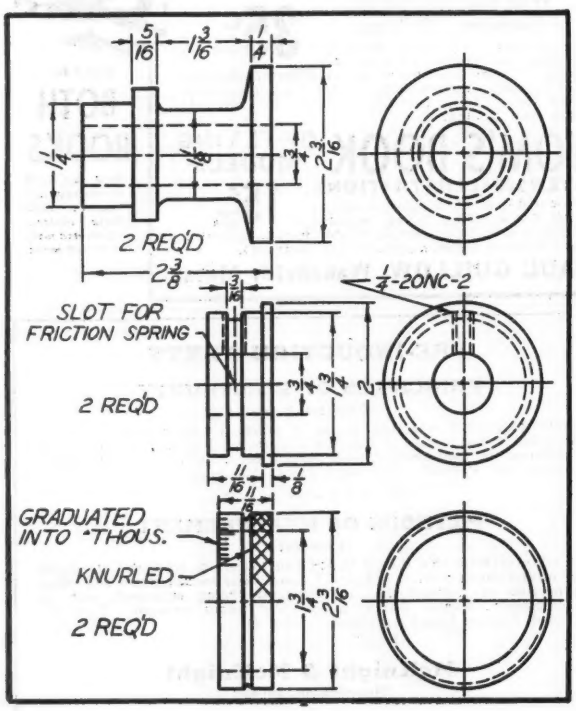
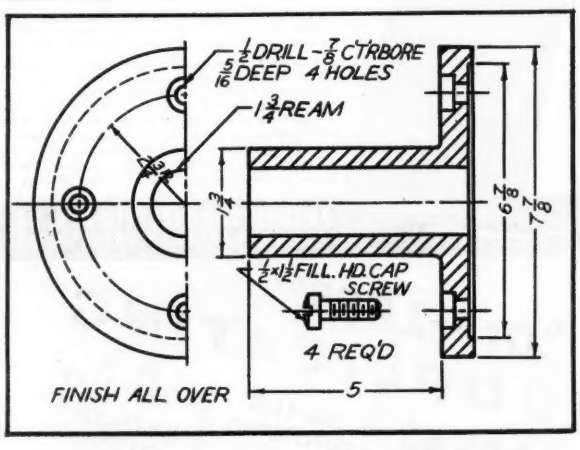




Drill Press Attachment—Continued from page 22

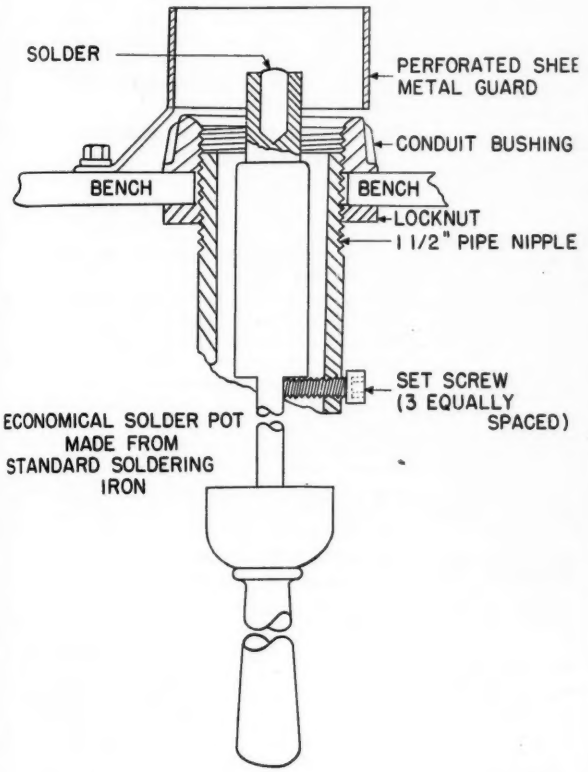


Stop for Drilling a Blind Hole

Frequently the graduations on the tailstock spindle are difficult to read or just aren't there. A blind hole may be drilled to a predetermined depth by making a bushing out of a piece of waste stock. Drill a hole the size of the drill to be used in the bushing and set the bushing on the drill in the drill chuck. By adjusting the size of the bushing so that the distance from the end of the drill to the bushing is the depth of the hole to be drilled, the bushing will act as a stop when the proper depth is reached.—David T. Armstrong, New Jersey State Teachers College, Newark.

Soldering Iron Makes Efficient Soldering Pot

Teachers of electricity and radio will find this little device, developed in industry, a very useful piece of equipment.



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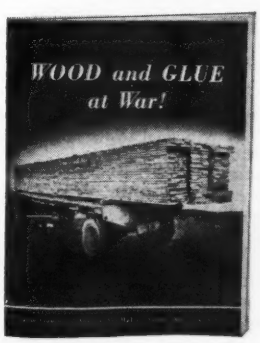

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Inquiries concerning materials described in these columns may be addressed to SCHOOL SHOP, 330 South State Street, Ann Arbor, Mich.

BOOKS:

Airplane Hydraulic Systems. Aument. New York: Ronald Press Co., 1943. Pp. viii + 120. $2.25.

The mechanic who works with hydraulic equipment should possess an understanding of the operation of essential units so that he may more efficiently carry out service activities; this book attempts to present simply and thoroughly the information the mechanic must have, at the same time eliminating material which is not directly applicable to the job. Explanations are given of hydraulic systems used to operate the retractable landing gear, flaps, tail wheels, bomb doors, generators, gun turrets, etc. Illustrations are schematic and are intended to show operation rather than engineering drawings of the parts.

Hugh C. Aument, Jr., is an instructor in airplane hydraulics, Roosevelt Aviation School, Roosevelt Field, New York.

Hand Tools. Wagener and Arthur. New York: D. Van Nostrand Co., 1943. Pp. ix + 174. $1.75.

This manual is designed to help the beginner learn as rapidly as possible the names of the various hand tools, identify them and know their purpose, and learn how to preserve their accuracy and usefulness. Pictures and descriptive material including identifying characteristics of each tool are given.

Albert M. Wagener is instructor in shop theory at the Henry Ford Trade School and Harlan R. Arthur is former principal of the Ford Motor Company Apprentice and Engineering Schools, Dearborn, Michigan.

Diesel Locomotives — Mechanical Equipment. Draney. Chicago: American Technical Society, 1943. Pp. iv + 472. $4.00.

A "how-to-do-it" book on the operation and maintenance of railway Diesel locomotives, clearly written, well illustrated, and thoroughly indexed. Rapid progress in the use and development of the Diesel has produced a great demand for men wishing to learn how to operate, service, and maintain these engines, and this book has been prepared especially for such training. The text deals in detail with the Diesel in all its developments, with special emphasis on its adaptation and use in railroad work. Authoritative and complete, the book is written in a fashion to suit anyone at all interested in the subject.

John Draney is past president of the United Associations of Railroad Veterans; he was aided in the preparation of the book by a dozen other practical and competent men in his field.

Engineering Drawing. Carter and Thompson. Scranton: International Textbook Company, 1943 (revised). Pp. 462. $3.00.

The original book, by the late Isaac N. Carter, has been revised and considerably expanded by H. Loren Thompson. Practice and theory are presented simultaneously on the fundamental principles of machine, structural, and topographic drawing. Additions to the book include a section on descriptive geometry, with information so arranged that the subject may be combined with the drawing course or given separately; chapters on welding drafting, perspective drawing, reproduction of drawings, pipe and fittings, and architectural and structural drawing; expansion of the chapter on dimensioning to include many more good examples of the process; a larger appendix; and an increase in the number of illustrations from 449 to 889.

Isaac N. Carter was associate professor of civil engineering at the University of Idaho, and H. Loren Thompson is assistant professor at Northwestern Technological Institute.

Basic Aircraft Construction. Peterson and Erickson. New York: Prentice-Hall, Inc., 1943. Pp. iv + 204. $2.00.

Designed to present an over-all view of the construction of an airplane so that the worker may better understand his job and through the application of the principles presented aid in the development of aircraft, this book contains chapters on the airplane and its parts, present methods of production, the blueprint, materials used, tools, machine shop, sheetmetal preparation and fabrication, and riveting. Appendix, containing important tables and terms, and a chart of trigonometric functions are included.

Ross A. Peterson is director of education and Raymond E. Erickson is supervisor of education at North American Aviation, Inc., Dallas Division.

Preservice Course in Machine Science. Lebowitz. New York: John Wiley & Sons, Inc., 1943. Pp. viii + 440. $1.96.

Prepared in conformance with the PIT 102 outline of the War Department and the U.S. Office of Education, this book is divided into 14 chapters whose content parallels that in corresponding sections of the syllabus. Summary at end of each chapter, along with two sets of questions: one group on textual information, the other on the application of the principles discussed. Essential mathematical phases of the subject are included, and physical and chemical principles are briefly stated. Illustrations and diagrams, index.

Samuel H. Lebowitz is chairman of the science department, Straubenmüller Textile High School, New York, New York.

Aircraft Blueprints and How to Read Them. Norcross. New York: McGraw-Hill Book Co., 1942. Pp. vii + 102. $1.75.

A basic and comprehensive book on aircraft blueprint reading geared to concentrated war emergency courses for training of aircraft mechanics in both construction and maintenance. Prints from eight of the country's large aircraft plants represent all types of aircraft drawings now being used in the United States and make it possible for the student to adapt himself quickly to reading prints in any aircraft plant. Army-Navy standards for rivets, nuts, bolts, screws, and other small parts are clearly described; symbols used are explained and illustrated. Appendix includes: nomenclature, decimal equivalents, drill sizes, symbols for electrical installation (Boeing Aircraft), and subject index.

Carl Norcross, a major in the U.S. Army Air Forces, is former managing editor of *Aviation Magazine*.

Simplified Physics. Small and Clarke. New York: E. P. Dutton and Company, Inc., 1943 (revised). Pp. x + 428. $3.00.

A revision of the former *Boys' Book of Physics*, this book presents in straightforward fashion the fundamentals of physics, without overpopularizing the material or giving too much technical detail. Many pictures and simple experiments are included on such every-day items as contact lenses, frequency modulation radio, depth mines, atom smashing, television, etc. A comprehensive chapter on the latest developments in color photography is an interesting addition to the book.

Fundamentals of Industrial Arts and Vocational Education. Johnson and Fenn. Chicago: Goodheart-Willcox Co., Inc., 1943. Pp. v + 138. $1.50.

A manual for administrators, teachers in training, and teachers in service, this book gathers together professional information from some of America's leading educators and classifies it for convenient reference under the following headings: history, federal aid, philosophy, curriculum, administration, psychology, testing, guidance, and trends. Question-and-answer technic is used throughout, with comments and references given at the end of each chapter. Illustrations show handwork in elementary, secondary, and adult classes.

William H. Johnson is Superintendent of Schools, Chicago, and Isadore M. Fenn is an instructor in the Chicago Vocational School.

A Primer of Electronics. Caverly. New York: McGraw-Hill Book Co., 1943. Pp. xi + 235. $2.00.

Written to give the layman an understanding of the basic principles behind some of the common electrical devices in everyday home and commercial use, this technically authoritative and complete book might well serve as an introductory text in the subject. Electric current, magnetism, electromagnetic radiation, and basic electronics are simply and clearly explained, with many diagrams and photographs included.

Don P. Caverly is a commercial engineer with Sylvania Electric Products, Inc., Salem, Mass.

Fundamentals of Shopwork. Swartz, Gunerman, Lafon. New York: Henry Holt & Co., 1943. Pp xv+474. (Teacher's Manual and Answer Book included). $1.60.

Designed especially for use in preinduction training, this book follows closely the PIT 103 outline prepared by the War Department and the U.S. Office of Education. Many good illustrations. At the end of each chapter are questions, self-testing exercises, problems, and drills on understanding of scientific terms. Appendix includes a glossary, selected laboratory experiments, mathematics refresher, tables, and index. Separate 16-page teacher's manual and answer book.

Milton J. Gunerman teaches woodworking in Public School 36, Alphonse Lafon is chairman of shopwork in the Haaren High School, and David J. Swartz is head of the mechanical drawing department of Haaren High School, all in New York City.

(Continued on page 28)

This Practical Elementary Textbook Teaches Riveting Thoroughly

Elementary Rivet Theory

By William R. Blommel

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Former Head of Department—Rivet Theory
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And Edwin L. Johnson

Head of Department—Rivet Theory
Ford Motor Company, Airplane School,
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This beginner's manual presents an elementary and easily understandable course in riveting, covering the subject with thoroughness for both practical and theoretical training. It starts from the simplest rules and directions, and proceeds, step-by-step, to the more advanced methods, and the special forms of riveting. The illustrations, both photographs and diagrams, are numerous, large and very clear; they show just how the tools are held and how the hands are used in carrying out every practical operation.

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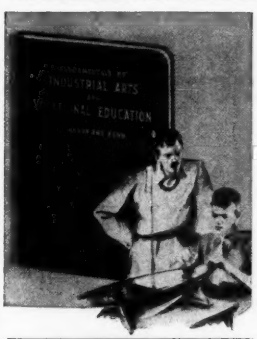

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These two new manuals give thorough, practical and realistic laboratory training in the fundamentals of radio. Book I gives the beginner a practical working knowledge of the electrical fundamentals of radio. Book II is devoted to the application, on standard radio equipment, of the principles learned in the first book. The author is Instructor in Radio, Arsenal Technical Schools, and Supervisor of Signal Corps Radio School, in Indianapolis. *Ready in March. Each $1.75 (probable).*

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By Jackey & Barlow

This is a very practical book for all those with little or no experience as teachers who are now being called upon to train workers for industrial operations. It shows, briefly and clearly, how to prepare the subject matter for a course, and explains the essential teaching techniques. Prof. Jackey is Supervisor of Trade and Industrial Teacher Training, California State Department of Education. Lt. Barlow is Asst. Liaison Officer for Vocational Training, 11th Naval District. *Ready in February. $2.00 (probable).*

BASIC MATHEMATICS FOR WAR & INDUSTRY

By Daus, Gleason & Whyburn

This new book is especially designed to meet the basic mathematical requirements of the Armed Services and the essential industries. It provides text material in arithmetic, algebra, plane and solid geometry, and plane and spherical trigonometry (including elements of navigation). Prof. Daus and Prof. Whyburn are both on the staff of the University of California and Prof. Gleason on the staff of San Diego State College. *Published February 1st. 277 pages. $2.00.*

The Macmillan Company, 60 Fifth Ave., New York 11

PAMPHLETS:

Primer on Electronic Tubes. General Electric Company announces a 24-page nontechnical booklet *How Electronic Tubes Work.* Eight basic types of electronic tubes and their uses are described. Free. Ask for booklet GEA-4116 from Dept. 6-215, Publicity Division, General Electric Company, Schenectady, N. Y.

Challenge to Vocational Education—Present and Postwar Problems is a monograph which grew out of conferences held by authors Roy A. Hinderman, T. H. Quigley, and C. A. Prosser at the Colorado State College Summer School. Their conclusions are stated with the hope that they will provoke equally frank discussion among vocational educators toward a better solution of vital postwar problems. 63 pp., 25c. The American Technical Society, Drexel Ave., at 58th St., Chicago, Ill.

Wartime Driving Teacher's Manual, written for use with *Sportsmanlike Driving* as a pupil textbook, is designed to help teachers of the preinduction driver education courses which the War Department has asked every high school to provide. The manual reduces to the minimum the references needed by the teacher to present the 10-unit, 45-period course, yet answers to all the questions in the Army manual may be found in the material given. Easily adapted to any of the five teaching programs the Army outlines. Manuals are available from AAA Motor Clubs or from the Traffic Engineering and Safety Department of the American Automobile Association in Washington, D.C.

Piper Cub . . . in War and in Peace, a 32-page full-color booklet just released by Piper Aircraft Corporation, gives an illustrated history of the light airplane from the time of its inception to the present day. Illustrations and descriptions of six Piper Cubs, a preview of the "Coming Air Age," and a discussion of the basic principles of flying are included. Write the Piper Aircraft Corporation, Lock Haven, Pa.

Training Womanpower contains a summary of reports from Bureau of Training agencies (including the VTWPW, RWPT, TWI, and ATS) as well as a summary of reports from the twelve regional chiefs of training. Bureau of Training, War Manpower Commission, Washington, D. C.

VISUAL AIDS:

Pop Rings the Bell, a new 16mm two-reel sound motion picture produced by the Jam Handy Organization for the National School Service Institute, dramatizes the new and growing needs of schools to provide the kind of education the community and nation must have to meet demands of the postwar world. For further data, address the National School Service Institute, Shop 307, Palmer House, Chicago 3, Ill.

Army Air Forces films, produced by the U.S. Army and released for civilian use to the U.S. Office of Education, are now available from Castle Films, Inc., for use in preflight training at a discount to schools of 10 percent. Motion pictures, identified below by *TF,* are all 16mm sound films and range in price (to schools) from about $9 to $28. Filmstrips, prefixed by *FS,* are 35mm silent and cost 65 cents each. Films in allied subjects are available as well as the following on aircraft engines and parts, and radio.

Aircraft Engines:

TF 1-135 Types, Mechanisms and Oiling System (36 minutes in length)

TF 1-136 Elements of Electricity as Applied to Ignition Systems (28 min.)

TF 1-137 Carburetion (37 min.)

Airplane Propellers:

TF 1-246 Principles and Types (17 min.)

TF 1-451 Hamilton Hydromatic, Theory and Operation (17 min.)

Aircraft Hydraulic Systems:

TF 1-174 BC-1 Airplane (15 min.)

Aircraft Hydraulic Brakes:

TF 1-162 Principles of Operation (20 min.)

TF 1-305 Types, Construction, and Action (30 min.)

Miscellaneous:

TF 1-566 Servicing the Aviation Spark Plug (24 min.)

FS 1-9 Classification of Engine Types

FS 1-15 Principles of Internal Combustion Engines

FS 1-17 Aircraft Storage Batteries

FS 1-22 Principles of Liquids and Gases

FS 1-53 Generator and Regulator Systems

FS 1-60 Aircraft Engine Pumps

FS 1-64 Intake and Exhaust Systems

FS 1-66 Aircraft Engine Troubles: General

FS 1-72 Aircraft Engine Operation

FS 1-82 Aircraft Engine Troubles: Starting

Radio:

TF-1-474 Radio Antennas: Creation and Behavior of Radio Waves (12 min.)

Full descriptions of these and additional films are given in the *Bibliography of Visual Aids for Preinduction Training,* available at the Division of Visual Aids for War Training, U.S. Office of Education, Washington, D.C. Films are available from Castle Films, Inc., 30 Rockefeller Plaza, New York, N.Y.

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*Note: These books have been listed in Leaflet No. 63 issued by U. S. Office of Education

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Keeping School Shop Records

BY *William C. Woods*

In situations where a minimum amount of time can be given to record keeping, the system worked out by the author has much to commend it. William C. Woods teaches industrial arts in the Passaic, N.J., Senior High School.

MANY articles have been published about keeping records in the school shop. Many sample record cards have been submitted, the contents of which are most complete and most desirable. But how many of us can afford time during shop periods to keep these records or even supervise boys in doing so?

In a senior high school such as in Passaic in which the shop is a general shop offering cabinetwork, woodturning, wrought ironwork, art metalwork, jewelry, and some leatherwork; in which the work is entirely elective and all individual with boys entering the shop with varied prehigh-school shop experiences; in which the boys elect shop in their sophomore, junior, or senior years; and in which the shop period is only 40 minutes long—how can an instructor teach boys, watch for their safety on power machinery, and keep many of the records that have been suggested from time to time?

With the above as my problem I had to evolve a simplified record system which would concisely tell me many things about the boy and his progress in the shop.

My record system consists of two 3" x 5" cards which can be ruled and lettered in pencil by each boy or which can be printed in the school print shop.

The first of these cards is the *Record Card*.

This card is filled out by the boy when he first enters the shop and each term thereafter.

It tells the date he entered the shop and the English he is taking (usually an indication of his class, sophomore, junior or senior in high school). It tells the number of periods of shop per week that the student is taking. It is a cumulative record of the marks and total points earned in the high school.

This record card is filed and kept for five years after the boy has left or graduated from high school. It is an additional record for the high-school office to check against in case of doubt in their records about credits and marks.

The other card in this record system is called the *Job Card*.

A new job card is filled out each term that the boy is in shop.

The card indicates: the job or jobs he has completed during the term; the job he is presently working on; the estimated cost of the material (computed by student and checked by instructor); the amount of money the boy has paid for material used (this is inserted by the instructor *only* but the card must be presented by the boy each time he pays); and the instructors' *O.K.* indicating proper completion of the job by the boy (the boy must present the card at this time with his completed job).

At the close of the term the *Job Card* is stapled to the student's previous job card and kept on file for five years after leaving or graduating from high school, thus giving a cumulative record of what the boy has done during the entire time he was in shop.

These *Record* and *Job Cards* are filed with alphabet guides in a metal file box for 3" x 5" cards, centrally located in the shop and are available to the students at all times.

No doubt there will be much criticism of this job card, particularly about omitting records in reference to attitudes, initiative, skill, tool processes, etc. But I still think that most instructors after a short time "know the boys" and can quite accurately, with the aid of the job card, know what a boy has accomplished in class.

SHOP RECORD CARD

NAME RYBAK (LAST) JOHN (FIRST)

DATE MO. YR.	HOME ROOM	ENGLISH	NO PERIODS SHOP PER WK	1ST QUARTER	2ND QUARTER	FINAL	POINTS EARNED
9-39	301	2-1	5	M	G	M+	1¼
2-40	301	2-2	5	M+	M+	M+	1¼
9-40	301	3-1	5	G	G	G	1¼
2-41	301	3-2	5	G	G	G	1¼
9-41	301	4-1	5	G	G+	G+	1¼
2-42	301	4-2	5	G+	G+	G+	1¼
			GRADUATED JUNE 1942				(7½)

SHOP JOB CARD

NAME RYBAK JOHN (LAST, FIRST) 301 (HOME ROOM)

PERIOD 7 DATE 9 (MO.) 41 (YR.)

JOB	COST	AMT PAID	INSTRUCTORS O. K.
CHRISTMAS TREE STAND (IRONWORK)	15	15	OK HCW
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(THIS JOB IS CONTINUED NEXT TERM			

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Reconversion . . . *(from page 5)*

home. In her kitchen, she will want more than the familiar expressions of "electric refrigeration and electric cookery" ever implied. Her requirements will include all the advantages that modern electric appliances can give her. The kitchen must be arranged scientifically to make it, in miniature, an efficient manufacturing production unit. In planning for the postwar period, there must be anticipated a homemaker whose understanding and discrimination in matters relating to the modern home greatly exceed those of years past.

Postwar standards are going to place exacting demands upon the homemaker, too. Mrs. Kiene says, "Women must keep abreast of progress, and vocational education is the only answer." More and more each year, she will become a machine operator—all about her, machines will be in operation to provide water, heat, and do household jobs. The time is here when a knowledge of practical chemistry and physics is proving valuable. In the operation of her automatic laundry—washing, rinsing, and drying her family's clothes—she finds need for knowing solutions, cleansing agents, and temperatures.

We need to educate our postwar homemaker in a practical way to assist her in the operation and enjoyment of her modern postwar home and its many conveniences.

The armed forces of this country have been built up by training men and women for the specific jobs they will have to do. That, I think, is the aim we should set in our postwar vocational education: train people for the specific jobs they will do, with courses that deal with the practical problems those jobs present.

It is almost impossible to forecast a long-range vocational education policy for the appliance industry in the postwar era, in view of the many developments and improvements on the way. For example, the aluminum industry presents new possibilities. The tremendous wartime expansion of this industry will bring relatively lower postwar prices enabling new uses to be made of the product.

Along with aluminum may be considered the light-weight magnesium alloys. There is also the anticipated wide use of plastics.

The trend in the home-appliance field is toward package units: complete kitchens with refrigerator, range, dishwasher, deep-freeze unit, water heater, sink, storage and working space; complete laundries with automatic laundry machine, clothes dryer and ironer; complete air conditioner and heater units for bedrooms, apartments, and offices.

This picture has for vocational administrators, and for manufacturers, an identical problem. It is, "Keeping ahead of the pace," and our aim should likewise be the same, "Teaching our people in a practical way how to do their jobs better."

IN THE Morning Mail . .

[Brief comments about SCHOOL SHOP and the field it serves are invited. Address the Editor, SCHOOL SHOP, Ann Arbor, Michigan.

Gentlemen:

Your magazine should have a column entitled "Short Cuts to Learning" or something similar. Some trade magazines have similar departments and call them "Tricks of the Trade." They usually pay one buck per item published.

Just on the possibility that you may start such a column, I would like to try for the first dollar with the following suggestion:

"Junior and senior high-school print shops rarely have a student long enough for the boy to learn where all the type cases are located. Therefore cases are often placed in the wrong cabinet. I have overcome this difficulty by having every type cabinet painted in a different (as well as pleasant) color. Cases match the cabinet. Every case is numbered. My students can easily find the place for the cases by the color and number. It also simplifies things for the instructor by his having only to say, 'This type belongs in the blue cabinet.'"

A. LEWIS HERZBERG
Hine Junior High School
Washington, D. C.

(To Mr. Herzberg a "buck" and to all SCHOOL SHOP readers the hope that they will send in similar short items so we can follow this excellent suggestion.—*Editor.)*

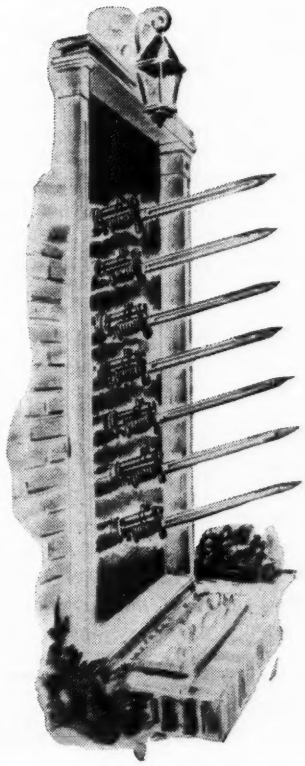
from Washington. *(from page 32)*

we mustn't forget that eliminating special school services, especially closing of industrial arts departments, and the like has cut many a youngster loose from his moorings and set him drifting down the murky waters of juvenile delinquency."

At the U. S. Apprentice Training Service: "I'm convinced that apprentice programs for returning soldiers will be compressed into two years instead of the usual four. You see, part of apprenticeship is shaking down into the job, or maturing. And these veterans will be plenty mature. . . ."

At the Veterans' Administration: "It's hard to believe, but we have already received more than 3,000 applications from World War II veterans for vocational rehabilitation and nearly 500 have already entered training."

The fight on the doorstep



THIS WAR can't be won on battlefields alone. One of the most critical campaigns of all must be waged right on the doorstep of every family in America.

This is the fight against higher prices and higher wages. It's a fight that *must* be won... or victories on battlefields will be meaningless.

It's like this. In America this year, our total income after taxes will be about 133 billion dollars. But there'll be only about 93 billion dollars' worth of goods to spend it on. If we all start trying to buy as much as we can, prices will shoot up.

As prices rise, people will ask for—and, in many cases, get—higher wages. That will put up the cost of manufacturing, so up will go prices again. Then we'll need another pay raise. If we get it, prices rise again. It's a vicious circle.

The Government has done a lot to help keep prices down. It has put ceilings on food and rent... has rationed scarce articles. But the Government can't do it all alone.

It needs *your help!*

Your part in this fight won't be easy. It will mean foregoing luxuries, perhaps doing without a few necessities. Tough? Maybe... but don't say that where the veterans of Italy and New Britain can hear you!

You *want* to do your part, of course. So do we all... farmers, laborers, white-collar workers, business executives. And the way to do your part *right* now is to observe the following seven rules for Victory and a prosperous peace...

1. Buy only what you NEED. And before you buy anything, remember that patriotic little jingle: "Use it up. Wear it out. Make it do or do without."

2. Keep your OWN prices DOWN! If you sell goods, or your own time and labor, *don't ask for more money* than you absolutely must! No matter who tries to talk you into asking more... *don't listen!*

3. No matter how badly you need something... *never pay more than the posted ceiling price!* Don't buy rationed goods without giving up the required coupons. If you do, you're helping the Black Market gang—hurting yourself!

4. Pay your taxes cheerfully! Taxes are the cheapest way to pay for a war! The MORE taxes you pay now—when you have some extra money—the LESS taxes you'll pay later on!

5. Pay off old debts. Don't make any new ones! Get, *and stay,* square with the world!

6. Start a savings account. Make regular deposits, often! Buy life insurance. Keep your premiums paid up.

7. Buy War Bonds . . . regularly and often! *And hold on to them!* Don't just buy them with spare cash you can easily do without. Invest every dime and dollar you don't actually NEED... even if it *hurts* to give those dimes and dollars up!

Use it up... Wear it out.
Make it do... Or do without.

A United States War message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by the Magazine Publishers of America.

from WASHINGTON by MICHAEL PACA

VYING for attention with the Thomas Bill (S. 1509), providing paid-training for veterans, is the Barden Bill, on which hearings are now in progress on the House side of Capitol Hill.

Rep. Barden's measure is interesting because of the number of times the word *or* is used in the text. It seems that Mr. Barden, (Democrat from North Carolina) couldn't quite make up his mind who should administer the proposed educational program. He gets around the predicament by naming in the bill the U. S. Office of Education *or* the Veterans' Administration. Thus, the Bill proposes that War Service Education and Training Agency shall be established in the Office of Education *or* the VA. And further, that a director of this agency shall be appointed "by the Commissioner of Education *or* the Administrator of Veterans' Affairs."

This gets awkward after a while; so Mr. Barden tosses the problem into the lap of the Chief Executive, saying: "The President is authorized to determine whether such agency shall be in the Office of Education *or* . . ."

Such legislative wavering is significant. It shows that educators may not always be entrusted with educational programs——unless they demonstrate organized strength in the Nation's Capital and talk in a loud, clear voice on Capitol Hill.

● Like the Thomas Bill, the Barden measure follows suggestions proposed in the Osborn Report, which first outlined ideas for meeting the "educational deficit" created by the war. Mr. Barden hence proposes that the federal government pay tuition and other fees for veterans chosen for study; that each person shall receive $50 a month base pay for periods ranging from a few weeks to three years.

The Barden Bill shows the marks of one definite victory which Washington educators scored as they helped lawmakers, both in the House and in Senate, draft a satisfactory veterans' education bill. The victory is that they have succeeded in impressing on Congressmen and Senators that vocational guidance and counseling is the crux of the veterans' education program. That is why the Barden Bill specifically says: "Adequate counseling services . . . shall be made available through close cooperation of approved educational or training institutions." The War Manpower Commission, the U. S. Employment Service, War and Navy Departments are called on to work with state departments of education to provide counseling services.

● But how is "close cooperation" between a string of agencies with such varied interests achieved? How would these agencies reach the people in the thousands of villages, towns, cities, or scattered rural communities? How would such cooperation help the boy or girl, man or woman returning from war—or laid off from war industry?

The answer to these questions may well lie in the Jager Plan for Community Counseling Services. Under this plan, some 30 small- and middle-sized communities will set up, by summer, community committees for adult counseling services. These experimental services will seek to find the patterns by which schools, local offices of the U.S. Employment Service, Veterans' Affairs, local industry, and other agencies can work together.

Harry A. Jager, plan's author, who is chief of the occupational information and guidance service of the Office of Education, told your reporter that seven states have agreed to try out this plan. They are Maine, New York, Maryland, Michigan, Colorado, Kansas, and Arkansas.

Each of the seven state supervisors of guidance who came to Washington to hear the plan outlined by its proponent, "immediately saw its possibilities." They have gone back home to decide on the communities in which the committee on counseling services shall operate. In each of the selected communities a committee will seek to bring together all the agencies concerned, to get an agreement on counseling policy, and to pool resources of guidance information and facilities.

Finally, each committee on counseling services will seek means to hire or train counselors to help the worried individual with his occupational problem. That will be a tough problem: No federal funds are available for any part of this project, unless later authorized by either the Barden or Thomas Bills. The community which really wants a committee on counseling services will have to support it itself.

● Off-the-record information from War Production Board officials shows there is little basis for optimism about "oversupplies of metals." Real facts are:

(*a*) Situation in metals has eased somewhat; we now have what we need for the production programs of huge landing craft, heavy-duty Army trucks, bombers, and all other war weapons. However, one or two fighting reversals will mean jacking up of production goals; tightening of metals again.

(*b*) Only copper and aluminum are plentiful at this writing. Little will be released for general use. To be expected, rather, is a cut-back in mining or production of each of the metals to save manpower.

● As your reporter made the round of Washington agencies he heard:

At the U. S. Office of Education: "Talk about fund-slashing! Here's an $69,000,000 cut for war-training programs. The Federal Budget for 1944-45 asks only $21,000,000 for war vocational training programs. Last year we asked —and got—$90,000,000."

At Senate hearings on causes and cures for juvenile delinquency: "And

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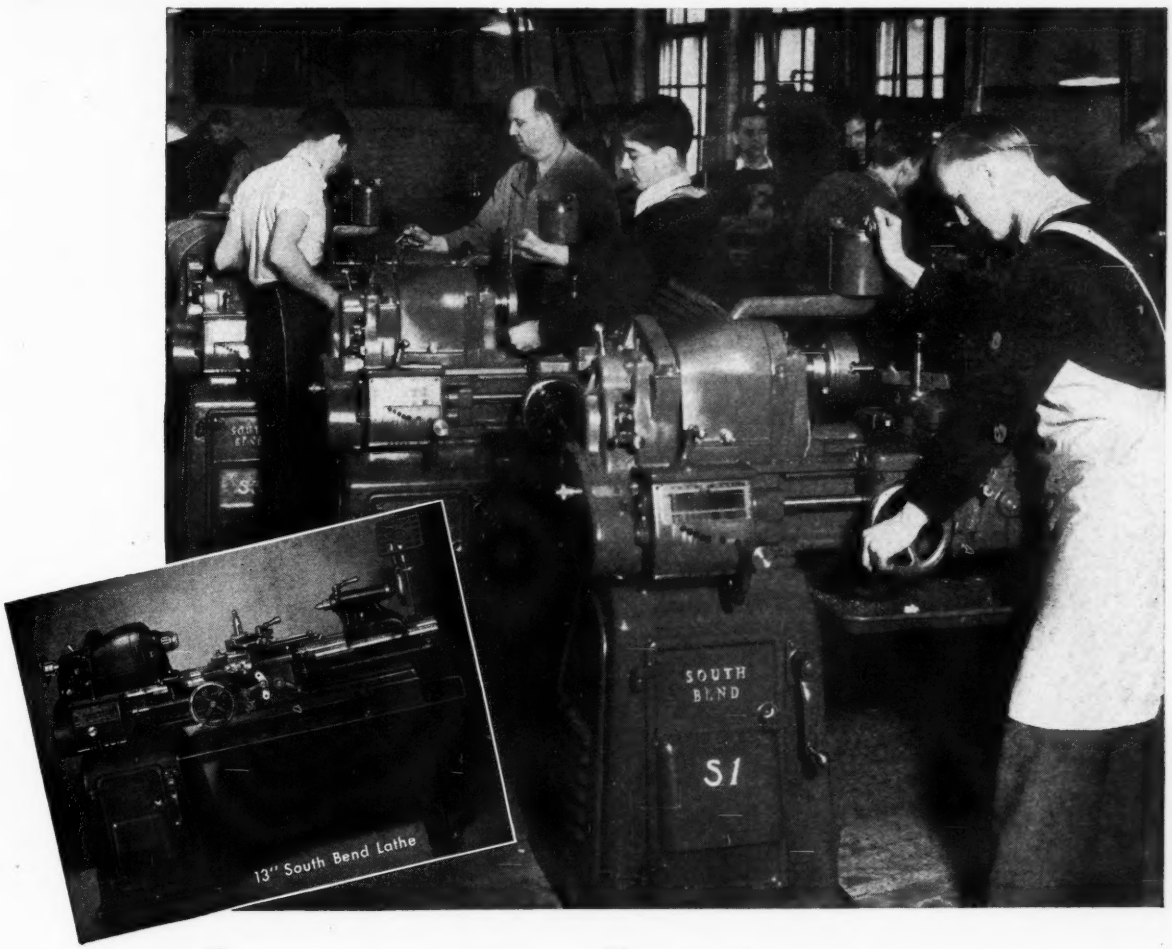

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